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Contributions: Of a technical nature suited to the purposes of this paper, will be liberally paid for if accepted. Correspondence relating to Rubber, Gutta Percha, Celluloid, Asbestos, etc., or any of their practical applications, is cordially invited, and the co-operation of all who make a study of these specialties either a pleasure or a duty is earnestly desired. All communications must bear the name of the writer solely as a guarantee of good faith.

Catalogues: Price Lists; Circulars; Reports of Meetings; early notices of changes in firms or corporations; views of factories, for office display; news items, particularly relating to new specialties; and local newspaper clippings (with endorsement of name and date of paper taken from), will be cheerfully received and fully acknowledged.

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Announcement.

THE extent and growing importance of the caoutchouc industry in the United States, and the fact that it is without representation in technical or trade journalism, are the reasons which have prompted this enterprise; and the character of the demand for such a publication is shown not only in the generous use which manufacturers make of our advertising pages, but in the more significant fact that up to this time the number of our subscribers is limited only by the number of those who have learned definitely that such a paper is to be published in their interest.

The initial plan laid out in these columns, and still to be improved upon as occasion and space offer, shows the result of a careful survey of the field by a corps of editors alike capable and devoted to the interests of the new enterprise. It aims to embrace all procurable information regarding the uses of india rubber and gutta percha in the arts and manufactures, and it will likewise treat fully of the recent very extended applications of the same to all branches of the electrical trades.

We propose to aid materially the scientific and the mechanical development of business in india rubber, gutta percha, and kindred products, by giving the manufacturer all meritorious information procurable as to old and new methods and compounds. Experience gained at different mills, and knowledge acquired directly and indirectly as to the workings of factories here and elsewhere, proves false the generally accepted belief and oft-vented statement that all rubber manufacturing channels are still guarded by really valuable and permanent secret processes. The trade has, in fact, of late years, through the keenness of competition in nearly all departments, made too rapid strides to admit of lasting, important secret changes in any one branch, and, in this respect, the rubber industry is like many others equally progressive.

As has been shown, more particularly by Chandler, Blossom, Bolas and Grimshaw, comparatively little is yet known of the chemical constitution of caoutchouc as well as of its very many possible chemical combinations, and, this being the case, we shall take pains to add in every way to the store of the rubber worker by obtaining and detailing the result of practical experimentation according to satisfactory formulas and desirable patented processes.

Besides keeping pace with new inventions, we shall gradually publish all claims attaching to patents of india rubber and to its sub classes heretofore granted in the United States and Canada, as well as in France, Belgium, Germany and Great Britain.

For the especial benefit of the jobber and retailer, every effort will be made to secure the prompt transmission to us of all particulars of new goods introduced in the market from month to month. These novelties, whether in the mechanical, electrical, druggists' sundries, dress goods, fancy goods, toy, or any other line, are to be fully described, in the department entitled "New Goods in the Market," and will be accompanied by illustrations whenever practicable, as well as by exact or approximate wholesale and retail prices.

Our circulation will reach not only the manufacturers and dealers to whom we cater specially, but it will cover a wide field in other directions, in that every number will contain information which is indispensable to the intelligent purchase of rubber goods by wholesale druggists, wholesale boot and shoe and clothing dealers, stationers, jobbers in hardware, dry goods and notions, and dealers in sporting paraphernalia; while for the benefit of manufacturers and purchasers of electrical appliances, and for electrical people generally, we will devote our attention specially to that important branch of electrical development which has been most neglected and most needs improvement, namely, the intelligent and progressive *mechanical* adaptation of electricity.

Upon one point we are anxious there should be no misunderstanding whatsoever: The reading and editorial pages of this paper are not for sale. Advertisements will appear only in the departments that are avowedly devoted thereto, and whatever is a paid announcement will always honestly be put before our readers as such.

We will add, finally, that we are independent in the fullest sense of the word, and shall continue to be so, favoring no one either directly or indirectly. This will the more readily be done since we have neither hobbies to ride nor pet schemes to advance. Our low rates for subscription and for advertising should bring us liberal patronage, and, through our prospectus, we earnestly invite correspondence as well as the interchange of views from manufacturers, scientists, and all others interested in the scope and success of this publication.

Steam Vulcanization.

UNTIL very recently all English-made rubber garments and a good many American so-called mackintosh garments have been vulcanized or cured by the acid process. There are many men high in authority who declare unreservedly that this process has never been reliable, and never can be made reliable. All purchasers of this class of goods know by experience that materials so cured are very apt to prove defective and are therefore unreliable. In this country, in addition to curing by acid, light weight gossamer cloth has heretofore been cured exclusively by the heat of the sun. The only reason this process has been resorted to is because no other was known, and because it is the cheapest by which goods of that kind can be cured. Within the last twelve months or so, steam vulcanization has been used by a few companies in making high-priced cloth intended for ladies' and gentlemen's garments, and with the greatest success, as goods so cured have proved uniformly reliable. One of the companies in Boston, after experimenting a long time and spending a good deal of money, is now using the process of steam vulcanization on light gossamer cloths. The result is a much softer feeling material, which will never harden, and which is absolutely free from all odor. Indeed, it now seems likely that it is only a question of time when the purchasing trade of this country will call for steam vulcanized fabrics in ladies' and gentlemen's garments.

Comparing the process of steam vulcanization with the acid process, there is certainly much in favor of the former as compared with the latter. All who have purchased English-made garments have had occasion to criticise the offensive odor which these goods emit; so much so as, in many instances, to make the garment absolutely useless. This class of goods, as manufactured in this country, is far ahead of any made on the other side; and there is no reason why manufacturers here should not be able to supply the entire demand and offer competition to foreign manufacturers in their own field, as well as in localities where they market their products. We refer especially to the South American republics, Mexico, the East Indies, China and Japan. Our government is at present making an effort to increase our friendly business relations with Central and South America and Mexico, and now is the proper time to make an effort by which some benefit may be derived by manufacturers of rubber cloth and garments. England, France and Germany export several million garments annually to these countries, while the exportation from the United States amounts to absolutely nothing. This is not as it should be, and we trust that an understanding will soon be arrived at, enabling our manufacturers to meet freely the demands of these markets which, by virtue of their geographical position, should properly have their needs supplied from this country.

Undervaluation.

WHY is it that English manufacturers are in a position to send thousands of single and double texture so-called mackintosh garments into this country, the purchaser paying a heavy duty on them, when precisely this class of goods is manufactured here of fully as attractive materials, made up in much better styles, and vastly superior in quality to the English goods? Is it because the English manufacturer pays less for his crude materials? Is it because he pays less for his labor? Or is it because the purchasing community must have English goods? These are reasons which have suggested themselves to us, and after careful investigation we find that none of them explain the facts. We have it on good authority that nine-tenths of this class of goods find their way into this country dishonestly. This is a sweeping charge and a serious one, but we have every reason to believe that it is a fact nevertheless, and the question as to how goods can be imported dishonestly into this country, is answered by the one word which forms the heading for this article, namely "Undervaluation." Were the English manufacturer compelled to invoice the goods he ships at their honest value, our home manufacturers would get nearly the full benefit of the existing tariff; and since the demand for mackintoshes is growing constantly in this country, and it is only a question of very little time when they will form a vast industry, it is well worth taking the necessary steps to stop this manifest evil while the business is in its infancy.

We have been shown letters from two Massachusetts Congressmen, who are simply waiting for necessary data enabling them to bring the matter in proper shape before the House, and we would suggest to manufacturers of this class of goods the necessity of at once interesting their representatives in Congress to the same end. It is hard enough to compete against honest foreigners, without being thus forced to meet a class of manufacturers who do not hesitate to defraud the American government out of a large part of the customs duty, and thereby deprive home manufacturers of the benefits to which they are clearly entitled under the laws. As it stands, there appears to be given to this particular branch of business protection in name and absolute free trade in fact.

We give elsewhere the first instalment of our ANNALS of india rubber, gutta percha, celluloid and asbestos, also of electricity, galvanism, magnetism and the telegraph This novel and very interesting classification has been made by able hands and will repay careful perusal, for it practically embodies a concise history of all the branches named.

It will necessarily be some time before all the circuits of the various illuminating companies in our principal cities are placed under ground, but meanwhile it is passing strange that the companies do not attend more carefully to the proper insulation of their overhead wires. There is an abundance of good types of insulated wires for out-door work, and the companies have not the excuse they had a few years back of not being able to obtain proper material at a reasonable price. The recent storm and the removal of the telegraph and telephone wires in many streets of New York have served to make more apparent the necessity for the reconstruction of some of the electric light circuits. By undertaking this, the companies would serve their own interests in more ways than one, and perhaps we should be spared some of the rabid writing on electrical subjects that has lately become so common in the dailies.

ANNALS

—OF—

India Rubber, Gutta Percha, Celluloid and Asbestos.

India Rubber Caoutchouc or Gum Elastic [called *cachuchu, cahuchu,* by the South American Indians; German, *kautschuk, federharz;* French, *caoutchouc, gomme élastique*] the concrete milky juice of numerous trees and plants growing throughout the tropical regions.

Gutta Percha [called in all languages by that name which is of Malayan origin; *gutta* signifying gum, and *percha* the tree from which it is obtained] the concrete milky juice of trees belonging to the family of Sapotacæ, found in the Malayan forests and islands of the Eastern Archipelago.

Celluloid, a product of recent invention, obtained by dissolving *pyroxylin* or *gun cotton* in camphor or other solvents with the aid of heat and hydraulic pressure.

Asbestos, Amianthus [Greek, *asbestos,* inextinguishable, and *amiantos,* undefiled; Latin, *amianthus asbestinum;* French, *amianthe;* German, *asbert*] a fibrous mineral found mainly in veins in the serpentine and other primary formations throughout the entire world.

B.C. 484–408.—Herodotus, the "Father of History," alludes to cloth made of the finer grades of asbestos by the Egyptians, who used it for cerements and wrappings for the bodies of the illustrious dead previous to incremation. Shrouds of asbestos of the time of the Roman emperors have been discovered and are now to be seen in the museums of the Vatican, at Naples, and elsewhere.

116–27.—Varro, "the most learned of the Romans;" Strabo, B.C. 54 to A.D. 25; Pliny, the elder, A.D. 23–79; Marco Polo, A.D. 1250–1324, and Giambattista Porta, A. D. 1540–1615, likewise make reference to the spinning of amianthus cloth and to many of its various applications.

A.D. 1519.—Antonio de Herrera-Tordesillas, one of the most prominent historians of Spain, after describing in Book V, Chapter III, of "The General History of the Vast Continent and Islands of America," "the reception that mighty prince (Montezuma) gave Cortes in that vast city of Mexico," thus details the *Flaschti:*

"....The ball was made of the gum of a tree that grows in hot countries, which having holes made in it distils great white drops that soon harden, and being worked and moulded together turn as black as pitch. The balls made thereof, though hard and heavy to the hand, did bound and fly as well as our footballs, there being no need to blow them.... They might strike it every time it rebounded, which it would do several times one after another, in so much that it looked as if it had been alive...."

Elsewhere, Herrera states that for the game of ball the natives of Hayti "had a house set apart, and they played it so many on a side without sticks or bats, for they struck the balls with any part of their bodies and with great dexterity and nimbleness. And the balls were of the gum of a tree, and although larger were lighter and bounced better than the wind-balls of Castile."

He also alludes to the Cazique having put upon him "clouts daub'd with a sort of gum;" also to the natives of *Tierra Firme* who "on their festivals, painted or daub'd themselves with a sort of clammy gum, sticking on it feathers of several colors."

In Vol. III, Book X, Chap. V, he says that, in the Province of Cumana, "there are trees, which having an incision made in them, a sort of milk runs from them which hardens into a white gum."

Allusion is also made to "the tree called *tabernaculo* (at Puerto Rico), from which flows a white rosin like gum anime, "us'd instead of tar for ships;" likewise to "the trees that yield gum anime (along the Bolcan Ridge), by them called copal, which they gather in November, after the rains, cutting gashes in the trees, whence it distils and congeals."

1615.—F. Juan de Torquemada, in the third volume of his "De La Monarquia Indiana," of which the first edition appeared in 1615, describes the Mexican Indians as making shoes, head-gear, clothing and other water-tight articles of the gum of a tree "which the natives call uléquahuitl (*castillao elastica*), which is held in great estimation and grows in this hot country . . . . it yields a white milky substance. To obtain it, the tree is wounded with an ax or cutlass, and from these wounds the liquid drops. The natives collect it in round vessels" wherein they allow it "to settle in round balls." . . . . "They used to play with these balls, striking them against the ground and making them raise to a great height."

1627.—Wolfen (John Jasper) is granted in England the right "for and during the terme of fourteen yeres, to use or exercise, practize or putt in use, a newe invencion for the making and preparing of certaine stuffs and skynns to hould out the wett and rayne;" and to "make, frame, sett upp or use all such engynes, instrumentes and devises" as the patentee shall have discovered "to purposes aforesaide," on payment of the "yerely rente of five poundes of lawfull money of Englande."

1634.—Eyres (John), Mowate (Charles), Walles (John) are granted for the term of fourteen years the exclusive right to use in England their process "whereby to make wollen cloths impenitrable of rayne."

1656.—John Tradescant, distinguished traveler and naturalist, issues a catalogue of the rarities preserved at South Lambeth (Museum Tradescantium) wherein is given the earliest notice of the appearance of gutta percha in England, viz: "VIII. The plyable mazer wood, being warmed, will work to any form." The Tradescant Museum passed into the hands of Dr. Elias Ashmole, and was by him transferred to the University at Oxford, where it was destroyed in 1755.

(*To be continued.*)

—Aluminum for dental purposes is said to be coming into favor. It is pronounced better than rubber, being bright, strong, odorless and wholesome, and less costly than gold.

—In a new storage battery devised by Mr. Pumpelly, of Chicago, the plates, which are of the gridiron form, are arranged to lie horizontally in the cell, insulated from each other by *rings of rubber*, with a *sheet of asbestos* cloth between each pair of plates to guard against the possibility of short circuiting.

Official Reports of Awards of Contracts for Rubber Goods.

BY U. S. WAR DEPARTMENT, *Washington, D. C.:*

To W. Ballantyne & Son, Washington:
- 6 doz. penholders, No. 7 ..... $0.90
- 4 doz. rulers, 12 in. 1.15
- 6 doz. rulers, 18 in. 1.90
- 40 lbs. equal to Davidson's velvet, No. 20 ..... $0.82 and 0.74
- 144 Gt. gross bands, No. 16 ..... 0.79
- 240 Gt. gross bands, No 17 ..... 0.89
- 72 Gt. gross bands, No. 18 ..... 0.99
- 120 gross bands, No. 000½ 0.74
- 108 gross bands, No. 0000½ 0.82
- 36 gross "package," 4¼x½ in. 1.75

To Parker, Stearns & Sutton, New York:
- 336 gross bands, No. 31 ..... 0.14½
- 480 gross bands, No. 32 ..... 0.18½
- 84 gross bands, No. 000½ 0.38
- 144 gross bands, No. 0000½ 0.46½

To Rider & Addison, Washington:
- 200 gross bands, No. 00½ 0.33½
- 36 gross bands, No. 0000½ 1.20

To William A. Wheeler, Jr., New York:
- 60 doz. penholders, Nos. 2 and 3. ..... 0.70

BY U. S. QUARTERMASTER GENERAL, *Washington, D. C.:*

To W. F. Bernstein, Philadelphia:
- 15,000 pairs rubber web suspenders; 3,000, 36 in.; 8,000, 38 in., and 4,000, 40 in., per doz. 2.15½

To Jesse St. John, New York:
- 3,000 pair rubber Arctic overshoes, Nos. 8, 9, 10, 11 and 12, per pair 2.00

BY Q. M. U. S. MARINE CORPS, *Washington:*

To Callahan & Gartlan, New York:
- Faber mammoth erasers, per doz. 1.64
- Penholders, g. p., per doz. 0.99
- Bands, ¼, No. 31, per gross 0.30

To R. Levick's Son & Co., Philadelphia:
- 600 pairs Arctic shoes, per pair 1.09

To B. Rich & Sons, Washington:
- 2,000 pair suspenders, per pair 0.17½

To W. H. Teepe, Washington:
- Eagle bevel erasers, per doz. 0.30
- Lead pencils, rubber tips, per doz. 0.30

BY U. S. DEPARTMENT OF THE INTERIOR, *Washington:*

To W. Ballantyne & Son, Washington:
- 8,000 gross bands, No. 16 ..... 0.06½
- 288 gross bands, No. 19 ..... 0.09
- 1,500 cakes ink erasers 0.02½
- 20 doz. pocket inkstands 4.45
- 600 cakes type-writer erasers, No. 102 ..... 0.02½
- 25 doz. No. 2 penholders 0.44

To M. Lindsay, Washington:
- 100 lbs. artists' rubber 0.55
- 20 doz. propelling pencils and penholders, H. R. 4.61
- 25 doz. No. 1 penholders 0.55

To E. Morrison, Washington:
- 100 doz. protector eraser 0.15
- 250 doz. pencils, rubber heads 0.46
- 200 doz. pencils, H. R. tips, average per gross 0.32½

To John C. Parker, Washington:
- 100 doz. pencil and ink erasers 0.96

To Parker, Stearns & Sutton, New York:
- 144 gross bands, No. 0½ 0.24½
- 1,620 gross bands, No. 00½ 0.31½
- 288 gross bands, No. 00½ 0.57½
- 1,080 gross bands, No. 000½ 0.36½
- 1,080 gross bands, No. 000½ 0.72½
- 288 gross bands, No. 11 ..... 0.04 5/16
- 12,000 gross bands, No. 32 ..... 0.17½

To Rider & Addison, Washington:
- 25 doz. No. 3 penholders 0.49

To W. A. Wheeler, Jr., New York:
- 25 doz. No. 7 penholders 0.90

BY U. S. TREASURY DEPARTMENT, *Washington, D. C.:*

To Holmes & Co., Washington:
- Rubber cloth, 45 in. wide, per yard $0.65
- Rubber cloth, 36 in. wide, per yard 5.50

To Mineralized Rubber Co., New York:
- Rubber bands for truck wheels, per pound 0.38

To M. Lindsay, Washington:
- Fine Para native rubber, unvulcanized, per pound 1.00
- Rubber boots, Nos. 8, 9 and 10, per pair 2.13

To Parker, Stearns & Sutton, New York:
- 12,144 gross bands, Nos. 30, 31, 32, 33, 45, 00½, 00½, 00½, average 0.24 5/16

To E. Morrison, Washington:
- 150 lbs. rubber, No. 20 Eagle Pencil "Bevel" 0.54

To W. Ballantyne & Son, Washington:
- 1,100 Gt. gross bands, rubber, thread, A. W. Faber, Nos. 11 and 17, average 0.68½
- 125 doz. gutta percha rulers, 12 and 18 in. 1.15
- 150 lbs rubber, No. 20, Davidson's "Velvet" 0.81
- 150 lbs. A. W. Faber's "Improved Artist's" 0.84

BY U. S. POST-OFFICE DEPARTMENT, *Washington, D. C.:*

To M. Lindsay, Washington:
- 355 gross bands, 0½, 00½, 000½, 000½, 0000½, average $0.473

To W. Ballantyne & Son, Washington:
- 4,100 gross bands, Nos. 11, 14, 16, 19, 31, average 0.11
- 100 doz. rubber rulers, 14, 16 and 18 in., average 1.54

To Ivison, Blakeman & Co., New York:
- 400 lbs. bevel erasers 0.50

To E. Morrison, Washington:
- 100 doz combined pen and ink erasers 1.07
- 500 doz. combined wood and rubber pen holders 0.31

To A. Wheeler, Jr., New York:
- 100 doz. gutta percha penholders 0.67

To Rider & Addison, Washington:
- 7,000 lbs. bands, 16 sizes, average 1.16⅞

A Point For Knowing Ones.

IT is a curious fact that almost all of the "oil-cloth men," more especially the old foremen and superintendents, have at one time or another been suddenly struck with the similarity of thin well-boiled oil to rubber. Without knowing that rubber substitute has been made of linseed oil for years, they are in just the position to rediscover this process. Some of them have made very handsome lots, and have tested them in ways that make the rubber manufacturer smile. One genial superintendent, whom we have in mind, buried a lump in a swamp, wrapped in a cloth, like the man with one talent, and let it stay three years. When he dug it up it was apparently as good as ever. Encouraged by this, he prepared a lot for an interested rubber manufacturer, and succeeded in spoiling nearly ten thousand dollars worth of goods. Of course had he been aware that free oil or acid would destroy the rubber, he might have guarded against so fatal an error, but he wasn't, and it seems neither was his victim; therefore the disaster.

What Becomes of Old Leather.

IT may have been noticed that now-a-days very few old shoes and scraps of leather are observable lying in our streets or dust-heaps. This is in a great measure due to the collection of all old scraps of leather, which are taken to mills, where they are cut up almost into fine dust; to this is added about forty per cent. of *india rubber*, and the whole is then subjected to a pressure of 6,000 or 10,000 pounds per square foot. The substance is then colored, and is sold at prices some fifty per cent. below that of natural leather. It is manifestly a very poor substitute, as it is wholly wanting in fibre; in fact, if it were not for the insane craze for cheap articles, which buyers vainly hope to substitute for those which, though the original cost is greater, are yet in the end cheaper, we should never hear of this compound, which might almost as well be made of saw dust as leather dust. In consequence of the manufacture and sale of large quantities of inferior leather, many old-established tanners are now stamping theirs with a trade mark, which is some guarantee to the buyer, as he may be sure no man will put his name or trade mark on an inferior article. It is hoped by this means to enable those who desire to buy the best quality of leather to be able to secure what they want, namely, a reliable article at a moderate cost.—*Boot and Shoe Recorder.*

Necrology.

DEATH has, within a comparatively short period, dealt heavily with some of the most prominent figures in the American rubber world. The original records here produced, though late, will nevertheless prove interesting.

Thomas Jefferson Mayall died February 18, 1888, at Reading, Mass., aged 62 years, from the effects of a cold contracted a few weeks before in Washington. At a very early age he was apprenticed in the mills at Great Falls, N. H., and, when ten years old, determined to go to Boston in search of more congenial employment. By his activity and earnestness of purpose he soon won for himself an enviable position, and his progress was such that, before the age of fifteen, he held quite a responsible berth in the Roxbury India Rubber Manufacturing Works, now occupied by the Boston Belting Company. Mayall was with Goodyear during much of the period of the latter's progress towards the discovery of vulcanization, and subsequently found lucrative employment in the establishment of the New York Belting and Packing Co. He had, meanwhile, manufactured at Roxbury the first rubber machine belt known in the United States, and later on succeeded in making numerous improvements in the production of rubber goods as well as in the electrical branches. For these inventions several patents were accorded him, both here and abroad, as will, in due course, be seen under appropriate dates in the Annals.

Emory Rider died very suddenly, May 24th, 1888, near Staunton, Virginia. He was a native of Massachusetts, but spent much of his life in New York City. Through Parton's article, written in 1865, we learn that it was in the latter place Charles Goodyear "had the good fortune to make the acquaintance of two brothers, William Rider and Emory Rider, men of some property and of great intelligence, who examined his specimens, listened to his story, believed in him, and agreed to aid him to continue his experiments and to supply his family until he had rendered his discovery available. From that time, though he was generally embarassed in his circumstances, his family never wanted bread, and he was never obliged to suspend his experiments. Aided by the capital, the sympathy and the ingenuity of the brothers Rider, he spent a year in New York in the most patient endeavors to overcome the difficulties in heating his compound. Before he had succeeded their resources failed. But he had made such progress in demonstrating the practicability of his process that his brother-in-law, William Deforest, a noted woollen manufacturer, took hold of the project in earnest and aided him to bring it to perfection."

Mr. Rider was for a time with Mr. Goodyear in a factory in Springfield, Mass., which he left to become the superintendent of a rubber establishment at Naugatuck, Conn. He remained also with Goodyear both at Roxbury and at Woburn, and, by his intelligent interest, afforded invaluable aid to him in many of his most important experiments. In all these years he proved himself to be, as the celebrated attorney, William J. A. Fuller, justly called him, "a manufacturer of the rarest talent and of the ripest experience." He is said to have been the first to vulcanize clothing, and the writer has often heard him relate the details of the many extraordinary trials he had to undergo for want of suitable mechanical means while endeavoring to perfect the vulcanization of large pieces of goods, such as pontoons, boats, etc., wanted by the United States government. This he was the first to successfully perform.

Emory Rider obtained here and abroad many patents for valuable improvements in the manufacture and treatment of india rubber and gutta percha, and, of late years, became prominent in enterprises for the chemical treatment of ores and minerals, bringing out finally the well-known "Rider's Ceramic Colors," which he considered one of the most important achievements of his life. His "Eureka" Vulcanizing Compound, which was not patented, has proved likewise to be a very important addition to the laboratory of the rubber manufacturer.

While in the Union Rubber Company, the brothers Rider purchased what was called "The Thomas Patent," and an arrangement was made with Stephen Moulton to go to England and establish, in Bradford Wilts, a factory of which Emory Rider become the working head. It was at this place he introduced an improved method for manufacturing non-efflorescing goods, by means of a compound exclusively his own, and although after his return to the United States, in 1857, he manufactured and sold the same mixture, no goods produced by others through the agency of the lead and zinc combinations which he was known to employ, have possessed the advantages claimed for those made by the secret process which it is said he carried with him.

Christopher Meyer, who died in New York City July 31st, aged 70, was one of the wealthiest individuals ever in the rubber trade, and was likewise for a long time its most conspicuous figure. He came to this country from Hanover, Germany, before attaining his fourteenth year and without means, but soon found employment in a machine shop at Passaic, N. J., where he received $5.00 a week. It is said that his first taste for rubber manufacture was developed while at work repairing the engines of Mr. Horace H. Day's factory at New Brunswick. By Mr. Day, then at the head of the United States rubber industry, he was induced to enter the factory, and his inventive turn of mind was such that before long he brought about an increased development of the business and became the superintendent of all the works. In due time he established a factory of his own, and from this moment he seems to have made the steady progress which brought him to the very front of the trade he had adopted. At the time of his death he controlled the Meyer India Rubber Company at New Brunswick, and the North British Rubber Company, of Edinburgh, Scotland, besides having large interests in the New Jersey Rubber Shoe Co. and the New Brunswick Hosiery Co., the Glendale Elastic Fabric Co., the Nashawanick Rubber Manufacturing Co., and the India Rubber Thread Co., of East Hampton, Mass. He was, likewise, prominently connected with the Oregon and Transcontinental, the Northern Pacific, the Cincinnati, Hamilton and Dayton, the New York and Boston, the New York City and Northern, the Painesville and Youngstown, and other railways, as well as with several banks, bank note, insurance and gas light companies. The extent of his power and influence is best understood when it is known that, of himself, he was able to withstand and offset the progress of the rubber trust created by the leading houses of the trade nearly two years ago.

John C. Meyer, Christopher Meyer's eldest son, who had been left in charge of his father's interests in the New Brunswick rubber industries, died of acute pneumonia at Atlantic City, November 11th, 1888.

Benjamin F. Goodrich died August 3d, 1888, at Manitou Springs, Col., in his forty-eighth year. He had long suffered from lung trouble, and had made several extended trips here and abroad in the hopes of improving his condition, but to no lasting purpose. He was born at Ripley, N. Y., graduated at the Cleveland Western Medical College in February, 1861, and entered the civil war as hospital steward in the 9th N. Y. Cavalry, rapidly gaining advancement until his retirement from the field with the rank of captain in September, 1864. We then find him, for a while, engaged in the Pennsylvania oil regions, and afterwards in New York City giving his attention to operations in real estate. It was through the many acquaintances made in the last-named place he, became interested in a rubber business located just below Tarrytown, on the Hudson River. Of this he soon became the principal owner, and his management of it was such as to fortunately induce him to erect, in 1870, a similar factory, though upon a much larger scale, at Akron, Ohio.

Upon the last-named enterprise he centered his whole attention, and the result of his energetical and judicious treatment of the new venture, the first of the kind west of the Allegheny Mountains, has made it to-day one of the most extensive and best appointed in the entire country.

Dr. Goodrich's scientific knowledge enabled him to originate many new processes and appliances of manufacture, and his fertility of resource and original ideas brought into the conduct of his large and constantly growing business many new methods that proved valuable by the success attending their use.

In Akron Dr. Goodrich was justly regarded as a foremost and

leading citizen in all matters pertaining to the industrial and social life of the place, and he was made President of the City Council during the year 1880. He always retained his interest in his army associations, being at the time of his death a member of the Ohio Commandery of the Loyal Legion, and likewise stood high in the Masonic fraternity, by whom the funeral services were taken charge of at Jamestown, N. Y.

Lindley H. Eastburn, who died on the 7th of March last, in his twenty-fourth year, was a native of Pennsylvania, and served his first apprenticeship in the rubber trade with the present Hon. Frank Magowan, of Trenton, N. J. Mr. Eastburn's attention to business earned him rapid promotion which finally took shape, through his employer's agency, in the formation of the firm of Smith & Eastburn, in New York City. Upon the dissolution of latter he became successively Treasurer of the N. Y. & Boston Rubber Co., Limited (N. Y. & B. I. R. Co.), and of the Consolidated I. R. Co., but was unfortunately unable to give much attention to the business of the last named, owing to the continued serious inroads made upon his constitution by the pulmonary disease which finally carried him to the grave.

The India Rubber Trade of Upper Burmah.

MR. WARRY, of the British consular service in China, at present stationed as political officer at Bhamo, has made a report to the chief commissioner on the india rubber trade of the Mogoung district. Rubber was first exported from Upper Burmah in 1870, and until 1873 the trade was free to all. Since the latter year, however, the forests have been worked under the monopoly system, five Chinese firms being the joint concessionaires, two supplying the money and three superintending the work. The price ranged from 60,000 to 90,000 rupees per annum, but in the present year the sale of the right produced a lakh of rupees. The forests occupy an extensive Kachin district north of Mogoung and stretching east across the Chinese border. The Kachins are exceedingly jealous of interference with their trees, and although at first they made the mistake of over-bleeding them, they are more careful now, and though the trees seen by Mr. Warry were covered with innumerable small incisions, even up to the tiny topmost branches, they were obviously not drained to the extent of half their power. Mogoung is the headquarters of the trade; four-fifths of the yearly supply is brought in there by Kachins in the employ of Chinese, the remaining fifth is purchased in the district by Chinese agents of the lessees. The practice is for the Chinese manager in Mogoung to make liberal advances to the Kachins to defray expenses during the collecting season; when the rubber is brought in the refund is made by selling the rubber to the manager at half the market price. The traveling Chinese agents, who also collect rubber, merely travel from place to place, buying such quantities as the Kachins offer, but as the latter have no standard weights they are usually cheated to the extent of about 70 per cent. The profit on this difference of weight more than pays the expenses of the agents. In most cases rubber is the subject of certain transit charges through the Kachin districts, tsawbwas, or local chieftains, levying a certain toll—perhaps two or three balls out of a hundred. So long as these charges do not amount to 10 per cent. there is no complaint. Whatever the toll, the Chinese manager and Kachin owner bear the loss in equal shares; but the latter is amply compensated by being housed and fed at the expense of the Chinese during his stay in Mogoung. Last year a new district was opened, and a Chinese capitalist employed 400 Chinese and Shan laborers to work the forests in the neighborhood of the amber mines. The local Kachins objected to the inroad and insisted on their right to the forests. A compromise was reached, 200 of the laborers being sent back at once, the remainder collecting rubber under Kachin supervision, to whom 10 per cent. was to be paid, and 200 Kachins, paid at the current rate, took the places of the 200 dismissed coolies.

—Celluloid may be mended, it is said, by wetting the edges with glacial acetic acid and pressing them together for a short time.

In the Rubber Worker's Laboratory.

I.

SULPHUR—SULPHUR CHLORIDE—BISULPHIDE CARBON AND OTHER SULPHIDES.

THIS is the first of a series of articles designed to benefit the rubber worker. They are solely intended to give brief practical suggestions arising from careful experimentation and to convey hints, as well as directions, concerning the most desirable, economical, process for the manufacture of the leading products used in the trade.

We will, in due course, take up all the important articles regularly quoted in our columns, and, as sulphur in different forms has long been the most valuable adjunct of the caoutchouc worker, it will now first be treated of.

Sulphur Sublimed, or Flowers of Sulphur. This is the most desirable condition in which the free sulphur should be employed, as its cost is now but slightly in excess of that of the ordinary sorts, and as it is clear of nearly all the impurities contained in the latter. It is well to bear in mind, however, that the distillation and sublimation of sulphur do not liberate it from all traces of sulphuric or sulphurous acids. As the latter will, of course, exert a bad effect upon the caoutchouc wherever found, all the flowers of sulphur of commerce should for that reason be carefully washed in water and gently dried before using. This is so easily done that it is a wonder every factory does not follow it up rather than incur the greatly increased outside cost of *sulphur lotum* or *flores sulphuris loti*.

Sulphur Precipitated, or Milk of Sulphur, would, as a rule, be preferable to the washed flowers of sulphur but its price, about four times greater, militates against its employment for ordinary factory uses.

It is a very fine, light, grayish-white powder, obtained by dissolving either powdered roll sulphur or the flowers of sulphur, preferably with slaked lime and water, adding hydrochloric (not sulphuric) acid, which unites with the lime and precipitates the sulphur. Royle's "Materia Medica" directs the boiling of one part of sublimed sulphur with two parts of slaked lime and sufficient water, adding hydrochloric acid to the clear liquid resulting.

Sulphur Chloride, or Sulphide of Chlorine, discovered by Dr. Thomson in 1804, was first called into prominence by Alexander Parkes, when, in 1846, he was granted an English patent for obtaining "the change upon caoutchouc, guttapercha, etc," quickly and without the aid of heat. This well-known cold vulcanizing process, now extensively practiced, consists in treating the article to be cured with a solution of chloride of sulphur in bisulphuret of carbon.

We will, farther on, detail various applications, besides giving tabulated results of actual experiments and since, in addition to its use for curing, chloride of sulphur is likewise very largely employed in the manufacture of india rubber substitutes, as will be shown under a separate head, we deem best to at once proceed to lay before our readers a desirable process for its manufacture at very low cost.

Chloride of Sulphur (SCl) is an oily fluid of a color varying, according to preparation, from orange yellow to dark red, and having a peculiar, penetrating and disagreeable odor, somewhat resembling that of sea weed. It boils at 138° (280°4 Fahrenheit), fumes strongly upon exposure to air and is decomposed in presence of moisture or dampness, yielding sulphurous, sulphuric and hydrochloric acids as well as free sulphur. By the sun's rays it is decomposed into the subchloride and into free chlorine.

It is generally prepared upon a small scale by passing dry chlorine over the surface of sulphur heated to 130° C. (266° F.), the di-chloride it usually contains being freed by repeated distillation at about 140° F. This is a costly process, and when one considers the high range of prices at which chloride of sulphur is everywhere quoted, the justifiable inference is that it must needs *always* be obtained in the above-named manner. Alluding to the aforesaid method, Mr. J. C.

Bell wisely observed not long since, that, with very large orders at the English list figures—$1.50 to $2.25 per pound (in the U. S., $1.00 to $2.20, for best)—a manufacturer could not but soon become a millionaire, *as the cost of the manufactured article can be reduced to about 16 cents per pound!*

We have examined many processes in the past, but none have we found to equal in actual simplicity and cheapness the method which the last-named gentleman devised and submitted to the Society of Public Analysts. Such an apparatus as he describes can be fitted up for *less than twenty-five dollars*, and will enable one to easily make *one hundred pounds weight of chloride of sulphur per week.* We quote Mr. Bell's own words:

"I will divide the *modus operandi* into three parts: the generation of the chlorine; drying the gas; passing the chlorine into flowers of sulphur.

"Generation of the chlorine: I used a fifteen gallon clay vessel, which was made by the potter specially for this purpose; it had only one aperture, which was two inches in diameter. In having another vessel made, I should prefer to have two holes three inches in diameter, exactly like a two-necked Woulff's bottle; the vessels which are kept in stock have holes four and five inches in diameter, and also have an outlet at the bottom, these holes are inconveniently large, and as the generator is in a water bath, there is a risk of the contents of the jar finding its way into the water. The generator was put into an ordinary iron kitchen boiler, water was put in and heated by a small fire. Into the generator was put twenty-eight pounds of maganese ore in pieces of the size of a small nut, containing from 70 to 80 per cent. of binoxide of manganese. A carboy of commercial hydrochloric acid was poured in, and the two-inch aperture closed with an india rubber bung containing a piece of glass combustion tube bent at about an angle of 120°.

"Drying the chlorine gas: A Woulff's three-necked bottle, gallon size, may be used. The tubes, if possible, should be ground into the apertures; in default of this, glass combustion tubing and india rubber tubing slipped over the necks may be used. The sulphuric acid bottle is not absolutely necessary; when it is used, the chloride of calcium will last a much longer period without renewing. The bottle must have a safety tube. The sulphuric acid bottle is connected with a stone aspirator about five gallons in size. An india rubber cork carrying a piece of tubing is put into the inlet at the bottom of the aspirator; the piece of tubing should be pushed through the cork into the vessel a distance of two or three inches. The aspirator must now be carefully filled with chloride of calcium in pieces about the size of small nuts—no powder must be put in; an india rubber cork carrying a tube must now be put in at the top aperture, which tube is connected with the vessel containing the sulphur.

"Passing chlorine into sulphur: The vessels I used were wide-mouthed, blue glass gallon bottles; these were fitted with good ordinary corks. India rubber must not be used, for the chloride of sulphur acts rapidly upon such corks, making them in a short time unfit for use. It would be better to use Woulff's bottles with ground glass tubes. The bottles are now filled with dry flowers of sulphur, taking care in the filling that room is left for the gas delivery tube. When the bottle is full, a hole should be made to the bottom of the bottle by means of a wooden rod about ¼ of an inch diameter; if this is neglected, and the delivery tube is pushed down through the sulphur, the tube becomes so filled with hardened sulphur that the gas has not a free passage. Two of these gallon bottles are connected together, the outlet tube of number two may be connected with an absorbing apparatus for waste gases."

(To be continued.)

—Manager to Applicant—"We are very much crowded now, but we can probably give you a place at $35 a month."

Applicant—"Oh, anything will do. I merely wish to study electricity and its application to medical science."

Blessed is he who sits on a dynamo, for he shall rise again.

"Wrinkles."

PROBABLY no branch of manufacture has more "knacks" in it than has the rubber business. Some of these are of a simple nature and others are complex; some are the jealously guarded secrets of one or two lucky manufacturers, and others are known to the whole fraternity. It is because of these numerous "knacks" or "wrinkles" that it is so difficult to enter the business and be successful without long experience in all of the details of manufacture, and it is also to the same cause that many of the losses sustained by the first manufacturers must be attributed.

In writing of these "wrinkles," it is proposed to follow no definite plan, but to gossip on those that come most naturally to hand. As we look over our notes we find an inquiry from a friend in the business, who writes: "I am having a deuce of a lot of trouble with 'puffing.' Can't tell what does it. Can you give me any idea?"

He does not mention the kind of stock he is at work upon, nor does he tell what he has done to counteract the blistering tendencies of the compound, but we are not wholly in the dark. We know that most of his goods are either cloth-wrapped and cured in a live steam heat, or they are moulded and cured in a press. His compounds then may be either black or white, and some of them contain cured scrap, recovered rubber, cheap gums and low grades of the common adulterants. The blistering is of course caused by a gas. Now, the question is what is the gas, and how is it to be eliminated?

The most common cause of puffing is moisture which may be in the rubber, in the whiting or in any of the ingredients of the compound. The careful drying of everything that goes into rubber compounds is so well understood that it is hardly worth mentioning as the remedy for this sort of "puffing."

Again the blistering may be caused by a too long "milling" of the gum, in consequence of which it becomes full of minute air sacs which, expanding during vulcanization a hundred times their first size, make each one a little recess in the rubber, and it is "porous."

Still another cause of porosity may come from carelessness in storing unvulcanized stock after it has been calendered. Rubber, in spite of its waterproofing qualities, is quite hygroscopic, and under certain conditions will absorb from twenty to twenty-five per cent. of moisture. If, then, the stock racks are where they are exposed to a damp atmosphere, the stock is likely to be one that easily blisters. A case in point is the experience of a superintendent of a large rubber shoe factory. He had been long troubled by blisters in the soleing. According to custom he had carefully examined all of the ingredients that went to make up the compound, had been especially particular to watch the mixing, calendering, making-up and curing, and, as a precautionary measure, had energetically charged the head of each department with being the sole careless cause of the trouble, and still the blisters blistered, and the "seconds" were increasing to an alarming extent. Finally, to cut short a long story, one of his men noticed that the room in which the soleing in long strips on canvas-covered racks was stored over night, was exceedingly damp. Then it was further noted that the steaming and washing of the crude gum was all done in the room below, and finally, light breaking on their darkened minds, the soleing was deposited in another room that was dry, and the blisters ceased appearing and the weary were at rest.

In mould work, many stacks that do not quite fill the mould will blister badly, while the same rubber crowded in until the mould is a trifle over-full will come out all right.

In ordinary cases of this disease of rubber, this internal small-pox cure in drying all compounds, heating moulds when filling, and the driving away and keeping away all moisture will effect a permanent cure. Most progressive rubber men practice this, if they do not preach it. Instance the arrangements for drying whiting, the careful ventilation of rubber dry-rooms, the hot cylinders over which cloth for friction is run, and even now many complain that their appliances are crude, and that damp weather hurts their goods.

Of course there are certain ingredients, harmless in themselves

that when combined in a compound, will form gases; let them be as dry individually as desert sand. In cases of this kind it is customary to add a little lime—just a few ounces to a batch—and the result is usually very gratifying.

In cheap mould work, where all sorts of recovered rubber is used, that has been compounded the Lord knows how, and filled in with ingredients of which there is no record, there is likely to be trouble of this kind, that will hang on with provoking obstinacy, and, as one is in ignorance of what he is using, that may baffle the wisdom of the wisest. I have known of cases of this kind, where a shoddy stock, if used the same day that it was "run," no matter how compounded, would puff like a frog's throat, but if left over night in a warm, dry room would vulcanize as firm as could be wished.

Sometimes a grand good plan with goods that blister is to take a sample of the stock and try to see how much it can be made to puff. One rubber man who tried this struck the prettiest "sponge-rubber" that I have ever seen, and he uses the compound to this day, while a continuation of his experiments led him out of his difficulty, and he discovered another compound that wouldn't blister under any provocation.

To conclude, if you wish to avoid blisters, look out for dampness and gases in the stock; if, on the other hand, you are looking for a puff-stock for sponge, balls or other work, use alum, wet sawdust or steamed "adamanta."

Rubber Combinations.

Editor of THE INDIA RUBBER WORLD:

The different branches of the rubber trade have at various times been induced to form combinations, when the returns manufacturers were able to obtain for their product were unprofitable. The mechanical rubber goods, the rubber boot and shoe, rubber clothing and gossamer manufacturers, all have had recourse to combinations in order to benefit their particular interests. The last combinations in existence were those of the rubber clothing and the gossamer manufacturers, and both died a natural death within a short time of each other. The former disappeared early this year in fairly healthy condition, the latter having passed away several months before, worn out by incurable diseases of all sorts, at no time from its beginning having been more than a sickly infant, and never during its life maturing into strong and healthy manhood. Its epitaph should read: "Died because too honest to live." Strange as it may seem, no combination ever formed here, so far as the rubber industry is concerned, ever succeeded in maintaining itself for any great length of time. They all enjoy apparent momentary prosperity, but soon go to pieces for various reasons, a chief one of which is generally the lack of ability on part of one or another of the members to live up faithfully and honestly to established rules governing the combination—the temptation to cut stipulated prices, which generally are made excessively high, being too strong to withstand.

Another apparent reason why rubber combinations have always been short-lived, and which was more than anything else the cause of the collapse of the gossamer and rubber clothing combinations, is the failure to recognize the relative importance of the jobber to the manufacturer as a distributor of merchandise, and a willingness and readiness on the part of the combination to concede to the jobber prices at which he can and will interest himself in the lines sold under the rules of the combination. Then again, in failing to graduate prices according to the demand and the seasons, instead of establishing a fixed price to govern at all times.

Many of the oldest and ablest rubber goods manufacturers express themselves as absolutely opposed to combinations of any kind, claiming that any apparent benefit derived from them during their existence is more than counterbalanced the moment the combine goes to pieces. Inflated with the feeling that they have made money during the combination, each one now rushes to the extreme in cutting prices. Crimination and recrimination becomes the order of the day, and in the mind of each rests only the one fact that he is honest, while the others are not. Such feelings lead to bitter competition and always result in forcing down prices to a ruinous extent, causing heavy losses to all in the trade. If the reasons presented here are facts, then the conclusion reached is that combinations as heretofore regulated and governed are not a benefit, but a detriment.

The question now is: can combinations be so governed and regulated as to prove a benefit, if not wholly, at least in part? Of this we are not sure, but we believe something may be accomplished. What then are some of the fundamental principles necessary to make a combination prove a benefit? First, it must be so constituted as to leave no doubt of its maintaining itself for a term of years. Second, it must be in absolute harmony with and have the support of the jobbers of the country. Third, *prices must never be advanced to a point which will diminish the demand for the goods or encourage extensive outside competition.* Fourth, prices must be so arranged from time to time as to encourage the jobber, who is the large distributor, to place his orders in advance of the seasons. Fifth, the adoption of a uniform scale of prices to be paid to factory employees. These important points, added to the many good points adopted by the last rubber clothing association, may make it possible to form a combination which will be a benefit and not a detriment. MANUFACTURER.

North Borneo Rubber.

ANOTHER plant that bids fair to have a large share in this country's future prosperity, writes Mr. W. B. Pryer, in the *North Borneo Herald*, is the Willoughbeia rubber, which grows naturally all over the country, but more particularly about Sandakan Bay. Growing, as it does, under natural forest shade, it requires no outlay at all for felling, clearing, holing, and all the other operations which make ordinary planting so expensive. When simply put in at the foot of forest trees, it takes care of itself, requiring no weeding to speak of, and when maturity is reached it yields an abundant supply of the valuable "gutta susu" or india rubber. As to what the yield is opinions differ. Some place the quantity as high as fifty catties to each creeper, others limit it to twenty catties, but in either case, the returns are out of all proportion to the money invested in starting a plantation of it.

The difficulty attending its cultivation hitherto has been the want of seeds from which to start nurseries. It may be safely predicted that the first person who can get a few creepers of it into bearing, from which to supply seeds, will make a handsome profit, irrespective of the sale of the india rubber itself.

—There was a man in town who thought him wondrous wise. He swore by all the fabled gods he'd never advertise. His goods were advertised ere long, and thereby hangs a tale—the ad. was set in nonpareil, and headed "Sheriff's Sale."

Trade Notes.

THE genuine, unadulterated Yankee is something that is not met every day in the week, and perhaps this is why so many of the commercial travelers enjoy calling at the Tuttle Rubber Works in Holyoke. We have yet to meet the visitor to that prosperous concern who does not see in the elder Tuttle a striking likeness to the popular conception of "Uncle Sam." Not only is the Yankee look and accent there, but push and enterprise are also evident. For months the works have been running sixteen hours a day, and still they are behind in their orders.

—Included in the large and complete plant of the Boston Belting Company, is a portion of the original building in which Charles Goodyear did some of his first experimenting. Could the old enthusiast but come back to the scenes of his former triumphs and failures, how astonished he would be; and, by the way, how disgusted with that unmanageable little stony brook that since his death has flooded the mill-room more than thirty times.

—It is no new thing for Western manufacturers to secure skilled Eastern help to run their factories, and as a rule, they offer such flattering inducements that few of the tempted parties have the desire to resist. The latest case in point is that of Mr. Albert T. Holt, who left his position as superintendent of the dress-shield department at the works of the Columbia Rubber Company, to accept a place in the "specialties department" of the B. F. Goodrich Rubber Co., at Akron, Ohio. He takes with him the good will and good wishes of a host of friends, and if we are not mistaken will be pleasantly surprised to find many Eastern men in his new field of usefulness.

—Just now, when nearly everything is dull, it is quite refreshing to run across a company in a position to say that work is rushing. This is the case with the Lambertville Rubber Company, whose mill is at present running nights to fill orders. The goods that they are at work on are the popular "snag proof" boots, that are now sold all over the country, the daily output of the mill being about four hundred pairs. It is interesting at this time to look back a little and note the progress that this company has made since it started in 1860. Like many other schemes in a similar line the factory at first was far from being a paying concern. For five years it struggled along under a cloud and then passed into other hands. At this time there were but fifteen persons in their employ, and the force was not much increased when in '68 the main building was destroyed by fire. This disaster did not, however, appear to discourage the owners, for the plant was immediately rebuilt on a much larger scale, and in October of that year they added to their former light work a line of belting, packing and hose. This venture proved so successful that they were soon keeping more than fifty hands busy and had in addition a first-class reputation as to quality of goods. In the fall of '76 the company began the manufacture of the snag-proof boot, which has been such a decided success that it has crowded out the other lines of manufacture, and made a reputation for its owners that has gone over the whole country.

—A very compact and neat plant is that of the Hartford Rubber Works, at Parkville, a suburb of Hartford. In addition to the regular moulded and mechanical goods that they have manufactured since their incorporation, the company have recently added a two-story brick extension, in which will be made a full line of druggists' sundries. This new department will be under the efficient management of Mr. Hawley, the former superintendent of the Fairfield Rubber Company.

—It is surprising what a call among the rubber shoe manufacturers there is for the genuine "down East girl." There are three different managers who are keeping advertisements in the Maine papers for this kind of help.

—The new mill of the Lake Shore Rubber Company, at Erie, Pa., is almost an exact duplicate of the plant of the Hamilton Rubber Co.'s mill at Trenton. Instead of being a three-story structure, however, it is but two stories in height. The appliances throughout the place are very perfect, the grinding-room being fitted with ten mixing mills and two calenders, while steam presses, hose machines and all the rest of the appurtenances of the first-class mechanical goods manufactory are to be found in this factory.

—Mr. E. P. McKissick, traveling salesman for the Highland Slate Company among the rubber trade, has left the road and accepted a home position with a Boston firm. As far as we can learn the hope that the powdered slate or "Talkene" would take the place of whiting as the common adulterant in rubber was not verified. There is no doubt but the company produced a superior article, and that it will have a good sale, but it will be long before any firm use a carload a day, which is the high-water mark that carbonate of lime has attained in several mills.

—Inventive activity is to be noticed in the rubber world as well as elsewhere. At the present time there are in process of development and already before the heads of three large rubber shoe factories three different machines for cutting soles at the rate of ten thousand pairs a day. It is noticeable that one of these mechanisms is the invention of a woman, who, to use an expression of her own, "has made the building of heavy machinery a special business for many years." This might sound as an idle boast were it not for our knowledge that a very complicated machine in paper manufacture, the invention of this same feminine genius, is in wide use, and has already netted her many thousand dollars.

—"I know I can make clothing as cheap as any man in the business," said a manufacturer recently; "and I know also pretty nearly the compounds that the others use, yet the other day some American firm sold a big bill of rubber garments at twenty-five cents each less than I can make the same goods. That is what makes clothing so dull and brings about a state of things where it is cheaper to shut down a mill than it is to keep it running."

—We can easily remember when thirty-five minutes was considered a very short heat, but in the dress shield business to-day the cures have been made shorter and shorter until Mr. Squires, of the Mattson Rubber Company, tells us that he has a line of shields that he cures in ten seconds, and they are nice goods, too. Speaking of this class of goods, it is a queer fact that the human body is to them a sort of vulcanizer, curing the shields while they are on the wearer, and if they are too much cured in the first place, they go to pieces very rapidly.

—It looks as if American rubber machinery was winning laurels from foreign makers, for a certain large manufacturer of grinders, calenders and the like, has just shipped good orders to Italy, Norway, England and Russia.

—During the war the United States Government was the purchaser of large quantities of rubber blankets; and so many were laid in that it is only within a few months that the last of them were used up. The manufacturers of this last lot—the Goodyear Rubber Co., of Middletown, Conn.—with no little interest, learned that these blankets, made more than twenty-five years ago, were just as good as the day they were shipped, and indeed promise to outwear most of the present manufacture of gum goods furnished our magnificent standing army.

—The Boston Car Spring Company have just put in one of the latest patterns of tubing machines, and are making some very nice looking goods. The machine was built by Edred W. Clark, of Hartford, and can not only be made to produce two tubes at a time, but, on such a medium size as ¼ inch, is capable of delivering 15,000 feet per day. We illustrate the machine elsewhere.

—We are pleased to chronicle the return to Boston of Mr. J. Edwin Davis, Treasurer of the Woven Hose Company, after an extended wedding tour. The corporation he so ably represents is still adding to its already extensive plant at Cambridgeport. The latest improvement is an extension of their mill room together with a new building to be used as a press room for belting. The three large vulcanizers that were built for the Mayall Rubber Works for hose,

packing and small work, have been purchased by this company and set up in their "heater rooms."

—Messrs. Brook, Oliphant & Co. have just added to their works at Trenton a large Birmingham Hydraulic Press 64x26, several small Wilkes, Thrope and McKenzie Presses, and new Royle Tubing Machines, which promise to increase the yearly product of the firm nearly $400,000. Their factory is now likewise supplied with Kane Automatic Sprinklers and with an Incandescent Plant of 250 light capacity. The last named, and the special engine connected therewith, were furnished and erected by Mr. A. Buttles Smith, E. E.

—The dexterous hand of the "intelligent compositor" is observable in the latest New York business directory, where the Goodyear Rubber Clothing Co. is made to masquerade under the strange title of the Rubber Cleaning Company.

—Probably most of the travelers over the Boston and Albany road have noticed the acres of "tables" in the fields about the building of the Gossamer Rubber Co. In spite of the imposing show, however, few would guess that those same tables placed end for end would easily make a fence that would go entirely around the city of Boston and have a little left over.

—The Candee Rubber Company have just added to their finely equipped plant a system of electric lighting. The advantages of this light over any other are easily apprehended when one takes into consideration the fact that in any rubber shoe factory the making up departments are always more or less filled with naphtha fumes from the cement.

—Parker, Stearns & Sutton, whose rapid growth and remarkable success has been a feature of the druggists' sundry trade for the past few years, have still further extended their business. This time their enterprise led them to seek a field for conquest outside of the United States; in other words, they have erected a mill in Canada, and there manufacture many of their specialties.

—The Hodgman Rubber Co. have recently added a large boiler and dry-house to their Tuckahoe plant.

—A rubber roofing paint company claim to import a rubber gum from Central America at a cost of four cents a pound that they use in their paints with marked success. The company claim further that they control the entire production of this peculiar gum, and although they have a five years' supply in their storehouses, will not sell a pound to anybody.

—The Johns-Pratt Company, whose vulcabestine packing and other combinations of asbestos and rubber are so well known, are enlarging their Hartford plant preparatory to increasing their business.

—The Bishop Gutta Percha Company, during the past two years, have added to their Gutta Percha and Cable Works a complete set of new machinery, designed by their own mechanical engineers, for insulating wires with their rubber compounds for high insulation, especially for electric light wires. They find the demand for good wires increasing so rapidly that they are already putting in additional machinery by which they hope to double their present output in a couple of months.

—In a correspondence of late date, the Mineralized Rubber Co., New York, report "a strong advance in gutta percha tissue which, owing to the rise in raw gutta percha, occasioned partly by short supplies and part by the enormous quantity likely to be used in the Pacific cable, is now held at fully forty per cent. advance over rates of three months since."

—The following awards have been made at the Paris Exposition: Boston Rubber Shoe Co., gold medal; Cobb Vulcanite Wire Co., gold medal; Okonite Company, New York, gold medal.

—The Colchester Rubber Company, successors of the historic Hayward Rubber Company, have made remarkable progress since their organization, a little over a year. Their factory has been run without interruption on a product of 7,500 pairs, amounting to a net valuation of over $100,000 per month, at present low prices. They employ over 700 hands, and their pay roll is over $6,000 per week.

—Mr. George F. Hodgman, President of the company which bears his name, is back at his desk after having spent the summer with his family in Europe.

—Mr. R. A. Loewenthal, of Loewenthal & Morganstern, New York, has been in Europe for two months past in the interest of his firm, and will probably not return until next month.

—The Butler Hard Rubber Co. have just added two new buildings to their already extensive plant at Butler, N. J., and they are now prepared in point of room and equipment to meet promptly every demand from the electrical and hard rubber trade generally. The new buildings are two stories in height, forty feet in width, and in the aggregate over five hundred feet in length.

—In the course of a recent article descriptive of the principal industries of Passaic, N. J., the New York *World* has this pleasant thing to say of a company which needs no introduction in these columns: "The factory at Passaic is an annex or branch of the original works at Newtown, Conn., but, since its establishment here in 1882, it has grown in size and importance, so that now it almost rivals its parent. The Newtown establishment is one of the finest mill properties in America, and employs between 300 and 400 men. The New York Belting and Packing Company confines itself exclusively to the manufacture of mechanical rubber, such as belting, packing, hose of all kinds, rubber mats, car, wagon and cylinder springs and bumpers; in short, nearly everything of a mechanical nature for which rubber is used, and owns and controls several patents covering different processes, incidental and indispensable to the making of the above goods, and particularly for machine belting, vulcanized between layers of a patent metal alloy, by which the stretch is entirely taken out, the surface made perfectly smooth and evenly vulcanized."

—We learn that the Board of Fire Commissioners of San Francisco have lately made a requisition for 5,000 feet of Maltese cross hose, the exclusive product of the Gutta Percha and Rubber Manufacturing Co., of New York, who likewise control the Baker fabric cotton fire hose, and make besides every description of flexible goods for fire department purposes.

Substitute for Ivory.

AN extensive industry has arisen in France to supply an artificial substitute for natural ivory in view of the growing insufficiency of the latter to meet the demands of art and industry. The majority of the products formerly employed were obtained by injecting whitewood with chloride of lime under strong pressure. At the Amsterdam exhibition, however, almost all the products had been prepared with the bones of sheep and waste pieces of deer and kid skins. The bones are for this purpose macerated and bleached for two weeks in chloride of lime, then heated by steam along with the skin, so as to form a fluid mass, to which are added a few hundredths of alum; the mass is then filtered, dried in the air, and allowed to harden in a bath of alum, the result being white tough plates, which are more easily worked than natural ivory.

—Friese Greene, a British photographer, has actually produced a picture with only the light issuing from his eye. Having stared for fifteen seconds at a 3,000-candle electric arc but three feet away, he closed his eye and quickly brought it over a sensitive plate at a distance of one inch. The result was a very faint but distinct image of the arc and the carbons, due probably to momentary phosphorescence of the retina. A second attempt failed, and gas-lights proved too weak to produce effect.

—"Sermons by telephone" have been introduced. No matter how unorthodox a clergymen may be in his belief, his sermon by telephone will make his doctrine sound.—*Norristown Herald.*

New Goods in the Market.

TO MANUFACTURERS:

It shall be our aim to embody in this department descriptions and illustrations of all the latest novelties introduced in the market; to the end that jobbers, retailers and rubber goods buyers generally may look here for information as to every thing new that each month or season brings forth. Manufacturers are, therefore, most cordially invited to co-operate with us in making the department as complete and attractive as possible—the distinct understanding being that no charge whatsoever, either direct or indirect, will be made for these publications Our reward will come through giving our readers valuable information; and that will be reward enough if manufacturers but co-operate with us in giving the information freely and in all cases at the earliest practicable moment.

In forwarding descriptions of new goods, be careful to write on one side of the paper only; be as brief as possible, but always write enough to give the buyer a clear idea of the article you offer; quote prices if practicable; give your full address, plainly written; and in all cases send a small illustration or wood cut if you have one.

—A very neat and convenient novelty is the little sponge holder that is rapidly being introduced into most of the cigar stands all over the country. It is an adaptation of the rubber suction cup that is familiar to so many as shown in a popular contrivance for holding a hook to the wall, or better still in the little clinging bullet of a toy gun.

—Wedges of pure gum are sold quite extensively to piano tuners for use in placing between the wires when a single note is being brought up to the necessary pitch.

—A new departure with the Columbia Rubber Company, of Boston, is the manufacture of a superior quality of Hospital Sheeting in ¼, ½, ¾ and 1 widths. In this, as in other goods, they have been extremely careful to reach the top notch of perfection, and the result is that they are having a call for thousands of yards of it. In color, smoothness of finish, and general excellence this sheeting rivals the best French surgical goods.

—Among the most pleasing novelties of this year are a new line of dress shields, in pure gum, stockinet and silk, made by a new and patented process, and as the shape was designed by an artist in costuming, they are certainly works of art. They also bear the well-known name of the Columbia Company, and are marked "The Columbia Seamless," "The Boston Seamless," "The Zephyr," and the "Pure Gum."

—In addition to their regular work the Johns-Pratt Company, Hartford, Conn., are producing a battery cell which is giving the best satisfaction. Another specialty of theirs is a shoe sole of asbestos, which promises to be much more durable than leather; thoroughly water-proof and fairly cheap.

—A new departure has been taken in the Rubber Belting line by the Combination Roll and Rubber Company. They are putting out a belt of heavy duck, folded over and over to obtain the plys, and having no rubber cover. It is, however, a rubber belt, as it has a high grade of friction passed through the duck before it is folded. The belt is handled by Mr. Hugh J. Blethern, who is well-known to the mill men throughout the country as the traveler for the Scranton Supply Company.

—The idea of a telephonic church is being carried out at Tunbridge Wells, England, where the pulpit of a Congregational church is connected with sixteen subscribers. We are told that "these included doctors and apothecaries, clerks working in various parts of the town, an invalid lady who has been obtaintng consolation from the telephone for several months, and some lazy club men, who went into the thing presumably more from a spirit of experiment than devotion."

ADULTERATED ELECTRICITY, TOO.—It is not so long ago since it was a painfully common thing to read of a poor lineman or other person being shocked to death by coming in contact with "live" electric wires. Now it is getting to be as common to read of men who received charges without being much more than disconcerted. They must be making adulterated currents of late.—*Philadelphia Ledger.*

Window Display of Rubber Goods.

"YES, sir," said the stranger, stopping in front of a rubber store and looking at the display of goods with a pitying shake of the head; "Yes, sir, you may well remark that it is a melancholy sight. If I couldn't take a barrow load of bones and a couple of mummies and make a more cheerful window full, I'd quit the business, I would!"

"Still we don't have much to work with, that is, much that is pleasing to the eye; the shapes of the articles are for the most part inelegant and the colors are—" I ventured timidly.

"Oh, colors be blowed," interrupted the critic. "Now look here. I've passed this window twice a day for fifteen years, and all that time that lob-sided old spittoon has been setting right in the middle with a damaged football in it, and neither have been half cleaned or dusted during all that time. Look at that water bottle. It used to be white, but generations of flies have decorated it until it is almost black! Did you ever see anything so sad in all your life as those rubber dolls? What mother would dare buy such disreputable looking toys for her darlings? Then those teething rings and rattles bristling and glistening with sulphur—"

"But rubber goods spoil very rapidly when exposed to the light and air," I interposed.

"So do heaps of other goods; but if you intend to show them at all you must take that into account. Let them spoil, or else change them so fast that they don't get a chance."

"I was brought up in this business," I replied with dignity, for I felt that this arrogant stranger had gone a trifle too far. "I was born and bred in this business and I am perfectly conversant with it. I acknowledge that our window is not a thing of beauty. We do not try to have it so. Had we wished we might years ago have spoiled car-loads of goods by displaying them in the sunlight. We choose rather to keep our goods under cover and to sell them, not on the looks of the window, but on their merit."

"And it is a matter of principle with you to keep a window looking as if it were a Baxter street pawnbroker's?"

"Who told you this place had been taken for a pawn shop?" I demanded, wrathfully.

"No one, upon my word," laughed this impolite fellow; "that was merely a chance shot, yet, to be candid, I don't wonder a bit at it. Things are heaped in there with just the same disregard of order, the same contentement with dirt, that the 'Uncle' displays."

"I think I have listened to your impudent nonsense long enough. I would suggest that you surprise yourself by attending to your own business for a while," I said tartly.

"Exactly—well now this *is* my business—I am an artist in window dressing. Where a man has any chance for display at all, and any goods to show, I flatter myself that I can usually attract attention," he replied.

His was such an ungainly figure to look upon that I was much in doubt whether it would not be wiser to summon the porter to hustle him away, but my curiosity at length prevailed, and I said:

"Could you make it profitable for me to 'dress' my window?"

"Well I should smile!" he replied. "Say the word and I'll put it in such shape that you won't know it, and you may pay me what you think it is worth when I have had a week at it. But mind you, I'm not hunting a job. I only wish to see what I can do with common rubber goods."

So to make a long story short I let him have his way, and we took our porter and began work then and there. To tell the honest truth, I was a bit ashamed when he took down some of the advertisements that I had kept in that window for so long. Some of the samples had grown so hard that they rang on the floor like blocks of wood, and others shivered into a thousand pieces at the first touch. A roll of matting wouldn't unroll, and many of the black goods were so crisping with "bloom" that they were disagreeable to touch.

When the window had been thoroughly cleaned inside and out, our expert remarked that he was going first to give the daily passers-by an object lesson before he began the serious business of window

decoration. So he borrowed a sink from the plumber's, set it in the window, unpacked a gross or two of the largest size "force cups," and after having them washed free from bloom, he stuck them all over the glass, and giving one to the porter, bade him go through the motions of cleaning a sink. Then by means of a couple of cards in each corner of the entrance, he informed the public, which had already gathered, what the porter was about.

I did not believe that this sort of nonsense would put any money into our pockets, until a man came in and bought a cup, remarking that his sink was always "running slow." This man was but a forerunner of a host of others. Some came in to buy "force cups" and went away with a rattle for the baby and a gossamer for the wife, and some came in to look at the novelty and went out after carefully informing us that they would return the next day and purchase, by which token we were sure that we should never set eyes on them again. At last the crowd thinned out, the buying stopped, and we had but a half-dozen cups left.

"Now," said the genius; "Now to dress the window."

I wish that I could describe the effect as I saw it, with the dust of the old-fashioned way of window-dressing still clinging in my throat, but, thank Heaven, no longer in my eyes. It was a window poem in rubber. A spread of our best goods in black and white this time—the white goods as spotless as new, and arranged so that they looked the whiter for the hard rubber sets that circled them. I did not know actually what nice goods we had in stock until I saw them arranged under the hands of this artist.

On the second day as on the first, trade was better, and scores who had never looked at our display before, now stopped and gazed with apparent interest. Of course of all the gazers, but few were purchasers, but still straws show which way the wind blows, and I was confident that we had been blind to a very plain fact, which was that we had just as pretty goods as half of the other trades.

At the end of the week our missionary in window-decoration left us, and I was content to give him a very comfortable check for his pains. After his departure we did not exactly drop back into the pawn-shop style of display, not exactly. I put in some time myself on the window, and thought up new schemes for showing our goods. When I went to a neighboring city I studied other windows, rubber windows when there were any, others that had novel designs where rubber stores were not present. The result was and is that we have got a name as a progressive firm, our trade in two years has quadrupled, while, aside from all that, the feeling that we had a business in which no man could take an interest, has passed away. We have grown young—we are making money—and all from the hints of a "Window Dresser."

The World's Fair.

Editor of THE INDIA RUBBER WORLD:

The all-absorbing topic which at present interests the business community of our country, is the World's Fair of 1892, to celebrate the discovery of America by Columbus. The first question in the minds of all is, "Where shall this great Exhibition of American Arts and Industries be held?" Strong claims for it are made by all the large metropolitan cities of the country, each particular locality claiming to be the only proper place, and newspapers, as a matter of course, invariably pressing the claims of the constituencies they represent, and belittling all other claimants. But, it matters little how much controversy there may be, or how bitterly one locality assails the other, the fact remains that if we are to have an International Exhibition at all, it must receive the endorsement and support of our National Government, and the only place in which it should and must be held is New York, the Metropolis and principal business mart of this great country. The time has come when the never-failing Americanism of our nation should assert itself, and all should have in view the success of this undertaking irrespective of locality, and as a country and a nation withdraw in favor of our greatest city. No locality need worry one moment about the ability and enterprise of New York's representative men to make the Exhibition, if held in their city, not only a success and a credit to the nation, but the greatest event of the kind the world has ever seen. When men of brains and means, like Mr. Pulitzer of the *World*, offer to subscribe $100,000 in cash, towards the successful carrying out of this project, all opportunity of criticising the enterprise of the representative men of New York City is lost.

In my own mind, and I doubt not in the minds of the majority of the people of our country, the location for this great Exhibition in 1892 is a settled fact, and New York City is the place. But, why need the people of this, the greatest country on the face of the earth be satisfied with only this one Exhibition in New York in 1892? Europe, with its comparative small area of territory, would have to be content with one great Fair in one of its great cities at the same time; but such is by no means necessary in our country, covering, as it does, so vast a territory that the whole of Europe in comparison with it becomes small. Why cannot we draw to our shores from near and far all the world and unfold to it in magnificence and grandeur not one exhibition, but five or six or more. Why cannot Boston, Philadelphia, Chicago, St. Louis, Cincinnati, and others of our Metropolitan cities vie with each other and hold exhibitions which must and will attract to each one the hundreds of thousands of visitors to the great Exhibition in New York? All our large cities possess the ability and enterprise, and what amounts to far more than anything else, the experience, to make such exhibitions a success. They all own large buildings built for this very purpose, which could be enlarged as the occasion demanded; and the ambition of each separate locality to outdo its neighbor, so characteristic with Americans, would result in bringing before the world an attraction so manifold as to create a very feeling of awe.

But, I do not want to be misunderstood. Nothing should be done with a view of detracting from the great Exhibition in New York; upon the contrary, everything should be arranged so as to harmonize with the intention to further the great business interests of our great country. What tremendous benefits would result to our common country and its kindred interests, by such an enormous and harmonious undertaking! How could we prove to the world, and especially to our sister Republics of South America, to Mexico, and Brazil, that this country is better able than any other on the face of the earth to cater to their wants? How could we better stimulate the business prosperity of our country, than by setting in motion our entire population in all directions to view the progress and the immensity of our vast mercantile interests? Thousands, in fact hundreds of thousands who could not spare time or who might lack the funds to visit the great Exhibition in New York, would be able to celebrate the discovery of this continent by visiting the exhibitions in their immediate neighborhoods. Nine-tenths of the visitors from foreign countries would extend their visits beyond New York, and thus familiarize themselves with the wonderful resources of the various localities of this the greatest country under the sun.

What a factor educationally such a project would constitute? What great sums such an undertaking would be likely to distribute, not in one locality, but all over the country? What great amounts of foreign capital would be attracted to find investment here? What a boom to our railroad interests? Who can, who will foretell the result? Can it be done? I say it can if we exert ourselves and show the pluck for which Americans are celebrated the world over.

How to make it realize the best results to the Rubber Industry! By united and harmonious efforts on the part of all. By an exhibit which will comprise the product of all the various manufacturers in one and the same place, instead of isolated exhibits in various parts of the buildings. Exhibits should be classified so as to separate the various lines of goods, each line forming a part of the greatest Rubber Exhibit in its special line ever made. Each manufacturer entering his own goods under his own name in friendly competition with the others, but having uppermost in his mind the benefit to be derived from the exhibition as an industry, rather than as an individual exhibitor; thus giving to the visitor a fairly ac-

curate idea of the scope of the Rubber industry in this country as compared with that of Europe. If we want to compete with the other side in the markets of the world, and we certainly should and can, this is the only way in which to obtain the full benefit which the Exhibition will offer. Then again, united action will reduce the expense to a minimum. As soon as the proper time comes, a joint committee should be appointed representing all lines, instructed to obtain the necessary space, and make the arrangements requisite, to insure to all who are identified with the Rubber Industry facilities for exhibition, which will guarantee the greatest amount of benefit, made possible only by united action.

A. RANDOLPH.

BOSTON, September 30, 1889.

Insulated Wires.

BY HERBERT LAWS WEBB.

THE question of properly insulating metallic conductors of electric currents is one which has given rise to a vast amount of experimenting and scientific investigation. I remember once hearing Mr. W. H. Preece remark, that "every man who has had anything to do with the advance of electricity has had a shot at a new insulator, and the result is that they are as numerous as the men who have been in power." This remark, which refers to insulators for the support of bare, over-head wires, may be also applied to the subject of insulating media employed for the protection of submarine and underground cables, and all wires necessarily placed in exposed positions. Since the practical application of electricity to telegraphy necessitated the use of insulated wires for the construction of underground and submarine lines, a great army of inventors and improvers have had a shot at a new insulating material, and more than one worker has not been content with a single shot, but has fired whole volleys. And when we consider the widely-varying conditions under which the electric current has been utilized particularly in recent years, it is easy to see that a wide opportunity has long existed for workers and inventors in this important field. The diversity of systems and substances now used in this item of electrical construction also testifies that of the many who have devoted their energies to a study of the subject, not a few have attained to practical results of great value, and no doubt they are harvesting a rich reward for their labors in the daily-increasing demand for good insulated wire.

In the midst of the present crusade against over-head wires, it is curious to notice that underground wires were tried and found wanting fifty odd years ago, when the first telegraphs were built in England. The British Post Office possesses specimens of the first system laid down between Euston station, the London terminus of the London and North-western Railway, and Camden Town, a distance of a little over a mile. The wires, five in number, were of bare copper let into grooves made in planks of creosoted timber and covered with a strip of wood treated in the same manner. It was soon found that the insulation was not high enough and the wires were put over-head on poles. This original underground system has been righly named by the post office officials, the "fossil" telegraph.

In was with the introduction of submarine telegraphy that the proper insulation of electrical conductors along their entire length became a question of vital importance, and it is a matter of history how many millions of dollars and how many precious months were spent before even an approximate solution of the problem was reached. Vast strides have been made in submarine telegraphy since those exciting times in the fifties and sixties when, while America and England were yearning for rapid intercommunication, thousands and thousands of miles of gutta-percha insulated cable were hastily and imperfectly constructed and shipped, sent to sea, paid out and abandoned. Transatlantic telegraphy presented at first an almost hopeless outlook, and it was not until many millions had been wasted and thousands of miles of cable had met with an early abandonment in the rolling deep, that Sir William Thomson, the Faraday of the present age, grappled the problem of insulation and supplied a formula to guide the constructors of the successful cable of to-day. And yet the solution remains an approximate one. Gutta-percha was first used for insulating submarine cables, and gutta-percha has held the field against india rubber in almost every mile of the hundred and twenty thousand which traverse the waters of our globe in every direction. But gutta-percha has serious inherent defects which add considerably to the difficulties of ocean telegraphy. One defect is that it possesses to a high degree, that bugbear of telegraph and telephone engineers, the property of electrostatic capacity; and another is—paradoxical as it may seem—that it is too good an insulator. The meaning of this is that if it were possible to use strong currents on long cables, the speed of signalling could be greatly increased, as the effects of electrostatic induction would be in a measure overcome, but although gutta-percha is a very high insulator for comparatively weak currents, the use of strong currents would tend to develop faults and "break down" the cable. Therefore what is needed for submarine cables is an insulating material which would allow of a certain uniform amount of leakage, and which would not deteriorate under the influence of strong currents.

Although gutta-percha has maintained its supremacy as insulation for submarine cables up to the present time, in the early days of ocean telegraphy a fierce battle was waged against it by the advocates of india rubber. While writing this I have before me the report of a lecture, delivered by Mr. Charles West, before the Royal United Service Institution, in February, 1861, in which the author confidently stated that gutta-percha was absolutely worthless for the purpose and that india rubber was the proper material to be used. Mr. West attributed the failure of the early cables in the Mediterranean, Red Sea and Atlantic solely to the fact of their being insulated with gutta-percha, which he branded as "an ineffective and imperfect material." He also cited the instance of 700 miles of gutta-percha covered wire having been sent out to India packed in solid deal cases, which, on arriving at its destination, was found to be almost useless on account of the deterioration of the insulation, the wire having been forced through it in many places. Many other instances of the failure of gutta-percha and its unaccountable change from the plastic to the brittle state, caused by a sort of spontaneous heating of the material itself, were marshalled in formidable array by Mr. West before he proceeded to describe his own highly successful experiments with wires and

cables insulated with india rubber, and he must have quite convinced his audience that gutta-percha, as an insulating material, was doomed forever, and that from 1861 forward all cables would be insulated with its triumphant rival, india rubber. However, Mr. West's pessimistic views have not been borne out by subsequent experience. The early failures of gutta-percha were due to hasty and imperfect manufacture and want of care in the storage and shipment of the completed cables, and these causes having been removed, gutta-percha, if it does not exactly "rule the waves," reigns almost exclusively over the plains and mountains away down beneath them.

Nowadays gutta-percha and india rubber proper have many rivals; some of these, which rejoice in distinctive and ingenious names, are near relations to the prime materials, while others are removed from the beaten track in every particular. Of these different systems I must defer writing until a future time, as this rambling introductory and would-be historical article has already exceeded prudent limits.

(To be continued.)

Gutta-Percha in America.

ALTHOUGH gutta-percha was quite extensively used by the inhabitants of its native country (the Malay Peninsula and islands adjacent), it was but little known in Europe until 1842, nor was it sent there, in any quantity, until about 1845, when all the scientists were anxiously looking for an insulator for electric wires. The adaptability of the new gum for insulation was so apparent that the German Government at once arranged to insulate wires with it. These wires were buried in the earth, and to such an extent was this process carried on that in 1846 nearly 1,400 English miles were insulated and buried in Germany alone, at an expense of about $600 per mile; the crude gum then costing not far from 10 cents per pound.

Unfortunately for this experiment, as well as for many others made at that time and subsequently, Goodyear had not long before perfected and obtained patents for his process of vulcanizing india rubber, and had then so turned the heads of all manufacturers of caoutchouc in favor of his compounds, that it was taken for granted that gutta-percha, which, from its appearance and chemical properties, must be at least first cousin to caoutchouc, certainly needed similar treatment. The gutta-percha was therefore dosed with sulphur. The result, especially on the first German underground cable, was that the sulphur attacked the copper, producing sulphate of copper. This not only injured the conductor, but being dissolved by the action of the current also attacked and soon destroyed the insulating properties of the gutta, and, although from that day to this, almost innumerable efforts have been made to combine sulphur with caoutchouc and gutta-percha, as well as with their compounds or substitutes, for insulating purposes, no compound containing sulphur has yet been placed upon a copper conductor without similar, if not equally disastrous results.

The failure of the German cable was so disheartening that, for a time, little more in that line seems to have been accomplished, and I believe it to be generally conceded that the first wire insulated with gutta-percha, for working under water, was made by Stephen T. Armstrong, of Brooklyn, N. Y. It was composed of No. 9 iron wire, insulated to the diameter of half an inch, and was laid across the North River.

Notwithstanding the fact of its failure as an insulator, gutta-percha was in such demand in England and Germany for other purposes that the imports had increased to 3,000,000 pounds in 1858, and several patents had before that date been issued for machinery used in its manufacture.

It was early in 1847 that Wm. S. Wetmore brought the first gutta to this country for Mr. Armstrong, who was then manufacturing india rubber goods in Brooklyn. Mr. Armstrong was so well pleased with the new gum that he went immediately to England, where he secured a full complement of machinery, as well as four of the most valuable patents, with exclusive rights for their use in this country. The patents were filed in Washington and the machinery set up in Brooklyn during the same year, 1847.

Ten years later, Mr. Armstrong sold all his gutta-percha patents, machinery and business to Samuel C. Bishop, who established a factory in New Jersey, whence he removed about 1860 to East Twenty-fifth street, N. Y., near the East River, and fitted up the factory now owned and occupied by the company bearing his name.

W. W. Marks, the late Superintendent of the Bishop Gutta-Percha Company, who died in March, 1888, was a nephew of S. T. Armstrong, and was working in his uncle's rubber works at the time the first gutta-percha machinery was received. He helped to set it up and had supervision over it through all its mutations from the day of its arrival to the day of his death—a period of over forty years.

The many friends of gutta-percha endeavored for a long time to employ it for water-proofing clothing, and for other similar purposes, to which caoutchouc had been found adapted. Gutta-percha, although much cheaper than india rubber, could not be made to work under the Goodyear patent, nor was any material progress made with it until Hancock in England, and Rider in America, tried and patented processes for its vulcanization by means of antimony and other ingredients. A company with a large capital was formed by Rider and others in 1848, and a factory was established in West Twenty-third street, New York, for the purpose of making gutta-percha boots, shoes, and general fabrics, which, it was claimed, would stand the heat of the tropics much better than those made of india rubber.

This company soon succeeded in getting up quite a trade, but found ere long that, however fine and promising, when new, their fabrics were short-lived, while, on the other hand, heavy calls for gutta-percha, in various channels, soon caused so great an advance in price that it was more expensive than caoutchouc—its successful competitor in the line of clothing.

Mr. Armstrong, in Brooklyn, and the manufacturers in England became satisfied at last that gutta-percha did not like medicine, and that the very best thing to mix with pure, clean gutta was a little more of the same article. This having been determined, its application was soon made upon quite a large scale, especially for the lining of tanks or

cisterns intended to hold acids or water as well as for all kinds of acid vessels, bottles, jugs, dippers, funnels, pails, etc., and for pipes intended to carry acids, soda water, beer or water.

Gutta-percha pipe was made by a machine and process similar to that used in making lead pipe and which produced any desired size—even to six inches diameter. One of these gutta-percha pipes, of about three inches bore, carried the water for several years from the city, under the East River, to Blackwell's Island.

On account of its plastic nature when softened by steam or hot water, gutta was extensively used for casting or blowing into moulds for dolls, toys, stationary goods, etc., but rubber and wax being cheaper have long since driven it out of the market for such purposes.

Notwithstanding its constantly appreciating price and the fact that for nearly all purposes, gutta-percha must, as before stated, be used *pure* and unadulterated while its cousin, caoutchouc, is, for almost all commercial products, mixed with cheap adulterants, which act mainly as a cement to hold together foreign matter. Gutta-percha is now largely employed for belting and bands intended to be used in contact with acids and in wet places. Kingsford, of the Oswego Starch Mills, not long since put in his third set of belts, weighing nearly 1,000 pounds and costing $2,000. Each of his first belts which were put up in 1857, two sets lasted thirty years, although almost constantly exposed in the damp and to acids and chemicals.

Gutta-percha is now extensively used by surgeons for splints and in thin sheets like tissue paper for dressing burns and wounds, for sweating and other purposes; by dentists for taking impressions and filling teeth; by electrotypers and engravers for reproducing engravings; by the Ordnance Department for taking fracture impressions, etc., etc.

It also makes the best cements for mending shoes and splicing leather belts, and also enters largely into Major's and other cements for china, glassware and other articles.

It is used by glove manufacturers, fine leather workers and others, for cutting-blocks; by pump manufacturers for valves in pumps and joints in water pipes, which are used in mining or wherever the waters to be pumped or conveyed contain either acid or alkali; also very largely for horse-shoe stuffing, to protect horses feet from balling in winter or from gravelling.

Gutta percha tissue is made so thin as to require from 14 to 20 square yards to weigh a pound, and, besides being employed as already stated, by surgeons and dentists, now comes into extensive use for the lining of ladies' dress shields, for mending skins and furs, for causing the silk of our beavers to adhere to the body of the hat and to make cloth adhere to the steel of the modern whalebone. Tons of it are used to save work where parts of garments can be made to hold together without sewing and in mending under-clothing, silks, satins and kid gloves.

Upon machinery intended for the working of gutta-percha, but few patents have been taken since the first few years of its introduction, each manufacturer making special machinery for his especial use.

The best gutta-percha, when received from India, looks very much like blocks or chunks of wood, but most of the gum has incorporated with it a liberal supply of bark and dirt which has to be removed by first chipping or slicing the chunks, then grinding and washing the slices in cold water, hot water and steam. The moisture of which the gum thus partakes must be driven off by mastication in steam cylinders, and worked through strong and specially adapted machinery, which is necessarily heavy and expensive. The best crude gutta, as imported, yields, of clean gum, from 70 to 90 per cent. of its original weight. H. A. Read.

Lampblack in Rubber.

Editor of The India Rubber World :

Pure lampblack is pure carbon, the same substance, in fact, as the diamond. The latter, however, is the crystalline, while lampblack is the amorphous or spongy form of carbon.

We often hear it said that lampblack, on account of its great lightness, is a very good material in a rubber composition. While lampblack is exceedingly light, it is also true that it is very injurious in large quantity, because through it the air acts upon the vulcanized composition when the goods are exposed to wear. The cause of this is the spongy nature of the lampblack, which assists the oxygen of the air to penetrate the material and slowly oxidize the sulphur to sulphuric acid, leaving the rubber devulcanized. The writer has found sulphuric acid in old rubber. We are, therefore, forced to the conclusion that rubber should contain only just enough lampblack to make it really black. The writer, being a manufacturer of lampblack, would willingly deny its injury to rubber were the facts not clear to him. For the best results in the wearing quality of goods, we must obviously use as little lampblack as possible, and therefore use a high grade of great strength. This should be prepared in such a way as to avoid the danger of flying, and thus injuring the material.

I would be very glad to inform any of your subscribers on any points relative to which they may not feel clear, or to receive any information on this interesting question myself. Samuel Cabot.

Mason Building, Boston, Oct. 4, 1889.

A Pretty Good Story.

IN illustration of how little harm a single company pitted against a combination can do, the following story is told: When the late rubber clothing combination was in force one prominent manufacturer refused to come in. Knowing that his capacity was large, the others kept close watch of the market and were not surprised to find their own orders falling off. At once a committee was despatched to hold another conference with the firm that was presumed to be doing the slaughtering, but nothing came of it.

A few weeks later and business was duller than ever, while it was rumored that the obstinate manufacturer had more orders than he could fill. So the committee was despatched the second time, with instructions to use every means to bring the obstinate party to terms. They went, and after the expenditure of money and time, returned again defeated. Several weeks more passed and business had not improved, while the statistician of the combination figured that their rival had sold $250,000 worth of goods that should have been theirs.

Then it was decided that something must be done. The committee were despatched a third time, with orders to stay until some kind of compromise was effected. This time they were successful, and the company joined the combination. When its books were opened for inspection, the others were surprised to find that in all the time that the combination had been in existence instead of selling $250,000 worth, the firm of which they had been so fearful had actually sold but $30,000 worth of goods, which was not a bit more than its legitimate share.

ANNALS

—OF—

Electricity, Galvanism, Magnetism and the Telegraph.

Electricity, *elektron, electrum,* meaning amber, from *helko,* to draw, in reference to its property of attracting light bodies.

Galvanism, from Galvani, the name of its discoverer.

Magnetism, *magnes,* the natural magnet, loadstone or lodestone, found abundantly near Magnesia, in Lydia. It is said that Magnes, a Greek shepherd, observed the attractive power of the loadstone on his metallic crook, and that the Greeks obtained the stone from Magnesia as early as 1000 B. C.

Telegraph, *tele,* afar off, *graphein,* to write, an apparatus for communicating intelligence rapidly at great distances.

B.C. 2600.—It is related by Du Halde (Jean Baptiste), a French Geographer, who published "*Description . . . . de la Chine et de la Tartarie Chinoise,* that the Chinese were, at this period, possessed of a chariot whereon stood erect a prominent female figure so arranged as to be always pointing to the South, thus indicating the four parts of the world."

B.C. 1040.—Tchikou Kong (Tcheou-Koung) is said to have taught at this time the use of the needle compass to the envoys from the maritime province of Youa-tchang.

B.C. 580.—Thales, of Miletus, Ionia, one of the "seven wise men of Greece," founder of the Ionic philosophy, and from whose school came Socrates, is the first to observe electricity developed by friction in amber, and, like Anaxagoras, imagines the magnet to be possessed of a sort of immaterial spirit, in obedience to which iron moves and is attracted.

B.C. 458.—Æschylus, the father of the Athenian drama, describes in his tragedy of Agamemnon, a line of optical telegraphic signals, by means of which Clytemnestra obtains early information of the capture of Troy. "It is Vulcan through his fires lighted upon Ida; from beacon to beacon, the messenger flame has hither fled."

B.C. 341.—Aristotle, another Greek philosopher, alludes to the electrical phenomena in the shocks of the torpedo. This is, likewise, referred to by Dioscorides, Greek botanist (A. D. 150); by Oppian, Greek poet (A. D. 204); by Claudian, a Latin epic poet (A. D. 395), and by many other writers.

B.C. 321.—Theophrastus, Greek philosopher, at Eresus on the island of Lesbos, observed the attractive property of a crystal called the *lyncurium* (termed by Linnæus *lapis electricus*), now supposed to be the tourmaline, and gave a description of it in his treatise upon stones.

B.C. 249-206.—According to the Chinese encyclopedia, *Poei-wen-yun-fou,* there were at this period "ships directed to the south by the *chin,* or needle."

B.C. 200.—Polybius, a Greek statesman and historian, describes his optical telegraph—*pyrsia,* because the signals were invariably produced by means of fire lights—which was an improvement upon the means of communication previously suggested by either Cleoxenus or Democlitus. It consisted of a board upon which letters were arranged in five columns, each column having five characters. The party signalling would hold up with his left hand a number of torches representing the number of the column from which the desired letter is to be taken, whilst in the right hand he would hold up a number of torches to represent the particular letter wanted. See 9th Dundee Edit. Rollins' Ancient History, Vol. vi, p. 321.

B.C. 58-56.—Lucretius (Titus Lucretius Carus), Roman poet, alludes to the magnet in his poem, *De Rerum Natura,* thus translated by Dr. Busby:

> . . . . Now chief of all, the magnet's power I sing,
> And from what laws the attractive functions spring;
> The magnet's name, the observing Grecians drew
> From the magnetic region where it grew. . . . .

A.D. 50.—Scribonius Largus Designatianius, Roman Physician, relates that Anthero, a freedman of Tiberius, was cured of gout by shocks received from the electric torpedo.

A.D. 70.—Caius Plinius Secundus, Pliny the Elder, famous as the author of the celebrated *Historia Naturalis,* refers to the *lapis lyncurius* and to the attractive power of amber as a fact well established at that period, but does not in any manner show that his own knowledge of electrical phenomena went beyond the discoveries of the old philosophers. In his thirty-sixth book he thus alludes to the magnet: "There is a kind of stone in Ethiopia which will not abide iron, but repulses and driveth iron away from it."

A.D. 121.—A Chinese dictionary, completed at this date, first makes explicit mention of the property possessed by the loadstone to communicate polarity to iron; "A stone with which a direction can be given to the needle."

A.D. 218.—Salmasius asserts that at this date amber was known among the Arabs as *Karabe,* a word said to be of Persian origin and to signify the power of attracting straws.

A.D. 400.—Marcellus Empiricus, a Roman writer alludes in his *De Medicamentis* to the magnet as "the attractor and repulsor of iron."

A.C. 413.—Zosimus, a Greek historian, is the first to call attention to the electrolytic separation of metals.

A.D. 450.—Aetius (Aëtû Op. Lib. 11 C. 25) says: "Those who are troubled with the gout in their hands or their feet, or with convulsions, find relief when they hold a magnet in the hand."

A.D. 968.—Kung Foo-Whing describes a method of transmitting sound through wires by means of the *thumthsein.*

A.D. 1111.—Kroutsoung-Chy, a Chinese philosopher, thus writes on the subject of the variation of the compass: "When a steel point is rubbed with the magnet it acquires the property of pointing to the *south;* yet it declines always to the east, and is not due south. If the needle be passed through a wick (made of a rush) and placed on water, it will also indicate the south, but with a continual inclination towards the point *ping,* or five-sixths south;" this was the variation at Peking.

(To be continued.)

—Three miles a minute is the rate of speed claimed for a new electric contrivance with which experiments have been made in the transmission of packages in Baltimore. An account of this progressive machine, which appeared in this paper yesterday, shows that the speed has been attained with safety, and shows, too, that hopes are entertained that it will in due time be available for passenger traffic. Imagine being able to come to New York from Philadelphia in thirty minutes, and from Boston in an hour and a half! These places would simply be deserted in daytime.—*New York Advertiser.*

Electric-Lighted Buoys.

A VERY recent report shows that the electric-light buoye established in Gedney's channel, New York harbor, havs continued in successful operation since the first night of their exhibition, November 7, 1888. This is an important achievement well worthy of note.

Up to the time of the laying out of these buoys, deep draught vessels could not avail of Gedney's channel, which was practically the only one open to them at night, since it was marked only by unlighted buoys, and the benefits to be derived from the Princes' Bay Light (Red Bank) were of little use, owing to the constantly varying strength and direction of the tide.

This has all been changed through a system of incandescent electric lamps, operated by a current generated on the Sandy Hook shore and conveyed through cables laid on the bottom of the sea.

Experiments were made early last year with an armored cable 6,000 feet long which contained two copper conductors insulated with *gutta percha*, and was laid from the light-house depot at Tompkinsville, Staten Island, to a spar buoy planted near the Robbin's Reef light-house. The first trials proved so successful that contracts were given out for the permanent work as follows .

The Bishop Gutta Percha Company manufactured the 32,000 feet of three-conductor and 15,000 feet of single conductor wire cables. The insulation consisted of three coatings of pure *gutta percha*, Chatterton's compound being used to fill up all interstices between the seven copper wires of the strand, besides being applied as a coating under each layer of *gutta percha*. The armor for the three-conductor cable was formed of sixteen No. 6 B. W. G., and for the single-conductor cable of twelve No. 9 B. W. G. wires.

The steam plant was furnished and erected by E. P. Hampson & Co., and the land line built by E. S. Greely & Co. The latter line consisted of eight copper wires, with covering of thoroughly water-proof insulation, running from a point on the Sandy Hook beach near the East Beacon light to the new Engine House in the rear of the fort.

The Edison Manufacturing Company furnished the lamps and electric plant complete, except the adjustable resistances for the lamp circuits, which were made by the Western Electric Company. The dynamos are adapted to operating 100-candle power incandescent lamps, the maximum current not being greater than 40 ampéres, with an electro-motive force of about 180 volts at terminals of machine, and are automatically regulated so that any number of lamps, from one to six, may be safely operated without change of speed.

The buoys were made at the Light-House station, of a species of juniper wood, which grows in the Dismal Swamp of Virginia. They average about 45 feet in length, 10 inches in diameter at the butt, 15½ inches at the largest section, and 11 inches at the top. Each buoy is painted, lettered and marked in accordance with the system adopted for the iron buoys, and a red sector in the east beacon light covers the ground occupied by the buoys and cables.

—A lot of little bootblacks perched on a curbstone may not be india rubber boys, yet they are gutter perchers.—*Texas Siftings.*

Gender of the Phonograph.

THE phonograph is feminine.
I'll tell you how I know;
When once wound up it talks and talks
In an unceasing flow.

It cannot keep a confidence,
But lets the secret out;
And yet it never seems to know
What all its talk's about.

Perhaps you think my arguments
Both rhyme and reason lack;
But here's the most convincing proof—
It always answers back.

—B. L. LAMPREY.

India Rubber Horseshoes.

THE late proposed substitution of India rubber for metal in the manufacture of horseshoes is based upon various supposed advantages, one of these being that the former enables a horse to go easily over all kinds of roads and round or slippery ground without slipping. The contrivance brought forward for this purpose is such as to obviate in one instance the necessity of using an iron shoe, can be moved momentarily when the horse is not traveling, and can also be used when the horse is shod with an iron shoe. According to this design the shoe consists of an India rubber bottom piece, molded to fit over or around the frog and the hoof, with a leg or projecting rim rising up the front and around about level where the nails are clamped, the projection having an edging under which a steel band or other appliance can be drawn and nipped tight to retain the rubber shoe. The band is connected by studs which pass through the heel part of the hoof, this being cut away from the inner side for the purpose, and the stud or studs may work eccentrically to obtain the grip or fixing. If the rubber shoe is used with an iron shoe, the frog portion or pad has a front plate and two side wings partially imbedded in it, the projection taking under the iron shoe to fix the rubber shoe in place. If the rubber shoe be divided or made thin in the center, a swivel or other bar can be contracted from the rear to reduce the width of the pad so that it enters easily, and also expanded so as to fix the rubber shoe in position.—*Mechanical News.*

—The idea that a signal passes through the cables between Europe and America in an inappreciable space of time is erroneous; the time it is in transit probably exceeds one-tenth of a second. In 1833 Wheatstone estimated the velocity at 288,000 miles per second; but his number is now known to be ten times too high. Prof. Gould has ascertained that aerial telegraph wires on poles transmit electricity at the rate of from 14,000 to 16,000 miles per second, and that the velocity of transmission increases with the distance between the wires and the earth, or, in other words, with the height of suspension. Subterranean wires, like submarine cables, transmit slowly. While wires suspended at a feeble height transmit signals at a velocity of 12,000 miles per second, those that are suspended higher give a velocity of from 16,000 to 24,000 miles.

—"Yes," she remarked proudly, "my husband is a member of one of the foremost professions of the age. He is an electrician."

"Is he with Edison?"

"No; he is a brakeman on one of the new Fourth avenue cars."—*Puck.*

Application of India Rubber to Horse-Cars and Motors.

A RECENT visit to the very extensive establishment of The John Stephenson Co., Limited, in this city, satisfies us that caoutchouc enters for a much larger share in the construction of cars and motors, for both elevated and surface tramways, than is realized by many of our readers. Since Mr. Stephenson made the first horse cars in 1831, fifty-eight years ago, many, of course, have been the changes wrought in their construction, but in no channel have the various applications proven to be of such moment or been so numerous, relatively, as in the line of india rubber.

Entering into the construction of the ordinary horse-car we find:

1st.—Rubber super springs, placed between the sill and pedestal, in order to insulate the body of the car from the running gear.

2d.—Rubber packings, mats, etc.

3d.—Rubber springs, which carry the journal box and give an easy motion to the car.

4th.—Rubber hose (life-guards), placed upon shank of journal-box, to throw from the track all obstructions likely to come in front of the wheels.

5th.—Rubber channels, inserted beneath and around the glass wherever metal sash-stiles are used, for the purpose of lessening noise and preventing possible damage to the glass.

6th.—Rubber insulators, attached to the lower part of the car-body, in order to lessen the strain put upon the brakes.

7th.—Rubber drop strips, placed under glass sashes, to diminish noise and possibility of breakage.

8th.—Rubber cushions, for doors and bumpers.

9th.—Rubber balls, fastened to bottom of windlass, so as to prevent chain running off and to protect horses from injury.

10th.—Rubber cones, inserted at top and bottom of springs, to offset any excessive pressure put upon the latter.

In electric motors, such as the above-named company have already constructed, notably for the Julien system in this city, the South Side Electric Line of Cleveland and the Salt Lake City Electric Railway, the super springs are sometimes replaced by a rubber cushion inserted in the eye of the wheel, between the hub and web. This cushion has the merit of preventing the springing of axles, thus keeping them perfectly straight and maintaining the wheels strictly true to gauge, and it likewise avoids the crystalization of the axles and motors.

Applications under the 2d, 5th, 6th, 7th, 8th and 10th headings also attach to motors, which, in addition, carry rubber battery cells and all the India rubber and gutta percha appliances connected therewith. The cells are made of strong though comparatively light, hard rubber, and possess the advantage over other cells of being less fragile, readily handled, and more easily connected in series. They also have acid-proof combs, made of soft rubber, so constructed as to maintain an even space along the entire surface of the plates.

Thus does Daniel Webster's *elastic metal* now successfully replace the doubtfully tempered springs and other attachments of former days, especially where important bearings are subjected to the excessive strain incident to hilly localities, and where heat forces them to what might be called an inordinate degree of expansion, for, unlike iron, steel or brass, vulcanized rubber will stand all climatic changes, being in nowise affected by any extremes of temperature.

—The printing of newspapers by means of electricity has been inaugurated in England by the *East Anglian Daily Times*, of Ipswich, printing its evening edition, the *Star*. The electric power was supplied from accumulators at the central lighting station and the experiment was thoroughly successful. The turning on of a switch provides power day or night, rendering the issue of frequent editions easy.—*London edition of the Herald.*

What Becomes of Old Shoes.

"Old clo" and "old shoe" merchants never pass an ash can without inspecting for old shoes. If any is found it soon finds a hiding-place in the capacious bag carried for the purpose. Each day's labor is taken to the home of the "old shoe man," where it is sorted over. Shoes that are not past a few days of usefulness go under the resuscitating care of an Italian cobbler. He gives the old shoe a new lease of life by endowing it with a new sole and other repairs. These go to some second-hand shoe store, of which there are a goodly number in this city.

The shoes that are past repair are taken to the old junk dealers, who in turn ship them to the shoddy factories. There they are pulled to pieces in order to remove the steel shank piece, if there be any, and then ground to a fine dust. This leather dust is then mixed with about forty per cent. of rubber, which has been gathered in the same way. The mixture of rubber and leather dust is spread in sheets about two feet square and subjected to a pressure of 6,000 to 10,000 pounds per square foot. The substance is then colored, and sold at prices some fifty per cent. below that of leather.

This manufactured leather is used by the manufacturers of cheap shoes, mostly for inner soles. As it is wholly wanting in fibre, it is manifestly a very poor substitute. Shoes with these shoddy inner soles are to be found in large quantities strung on poles and bearing the legend, "All leather, $1."

The industry of making shoddy shoes has greatly improved. At first straw board was used for inner-sole counters, and sometimes for out soles by pasting over with a thin veneer of sole leather. Next leather scraps and old shoes were ground up and mixed with the straw paper. This gave a little better substance. Now shoddy contains leather dust and rubber.—*N. Y. World.*

India Rubber Supply.

THE requirements for india rubber being now so large, it is satisfactory to know that the india rubber trade on the Chindwin, in Burmah, although it has only existed for a year, has increased to such an extent that the local government has placed a large export duty on all rubber passing Kendat, the first revenue station on the way to the seaports, besides imposing a license costing ten rupees per annum on all brokers or buyers of the article. According to a recent report rubber is extracted from the *ficus elasticus*, which is similar in appearance to the banyan tree, except that the leaves are larger and of a darker color. Each tree is tapped daily during the season, which extends from November to June, nothing being done during the remainder of the year. In April, 1887, a Chinese syndicate at Bhamo received a monopoly for the extraction of rubber in the Mogoung district. This expired last October, and since then the trade has been thrown open to all. On the Chindwin the trade is in the hands of an English company, which, in spite of vigorous opposition from the Chinese traders, is working satisfactorily, because the natives prefer dealing with the Europeans. All the transport is carried on by native boats down the Chindwin to Kendat, where the rubber is transshipped into steamers. The system of collecting is to send a contractor with a sum of ready money to all the villages in a particular district to make advances to the head men, who, in their turn, send the villagers to the forests to extract the rubber, so that month by month each station has its own stock. This is bought for cash and sent down the river, the head men keeping the advance for further operations.—*Engineering and Mining Journal.*

—A test was recently made on the Raleigh and Gaston Railroad of a new process invented by Baylus Cade for telegraphing to and from moving trains. The current is maintained by means of a drag attached to the car and which slides over a set of wires laid along the track. Messages were received from the offices at Raleigh and Greensboro while the train was running at the rate of thirty miles an hour.

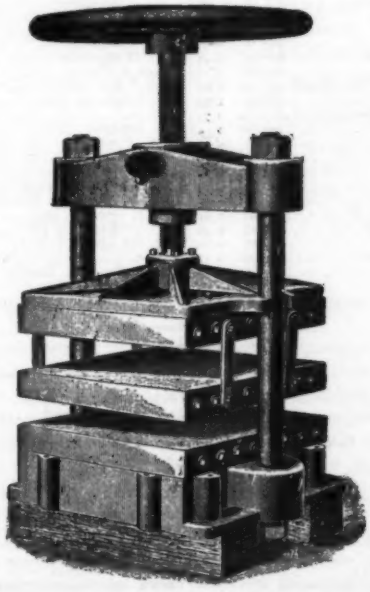
U. S. IMPORTS, EXPORTS AND RE-EXPORTS.

For the MONTH, and the SEVEN MONTHS ending JULY 31, 1889, compared with the corresponding periods of 1888. OFFICIAL.

ARTICLES.	QUANTITIES.				VALUE IN DOLLARS.			
	MONTH ending JULY 31—		SEVEN MONTHS ending JULY 31—		MONTH ending JULY 31—		SEVEN MONTHS ending JULY 31—	
	1889.	1888.	1889.	1888.	1889.	1888.	1889.	1888.
IMPORTS.								
FREE OF DUTY.								
India rubber and gutta percha, crude.....lbs..	2,064,563	1,976,988	19,491,753	21,548,706	725,243	797,545	7,328,754	9,242,283
DUTIABLE.								
India rubber and gutta percha, manufactures of..	.....	.....	.....	.....	30,274	25,610	204,593	230,250
EXPORTS.								
India rubber and gutta percha, manufactures of..								
Boots and shoes.....pairs..	28,246	2,947	61,144	27,977	28,110	4,231	62,634	37,040
All other.....	.....	.....	.....	.....	68,700	61,614	446,247	442,254
RE-EXPORTS.								
India rubber and gutta percha, crude.....lbs..	48,091	60,453	142,314	349,904	18,120	26,967	57,401	168,087
India rubber and gutta percha, manufactures of..	.....	.....	.....	.....	.....	.....	1,984	212

Clark's Rubber Press.

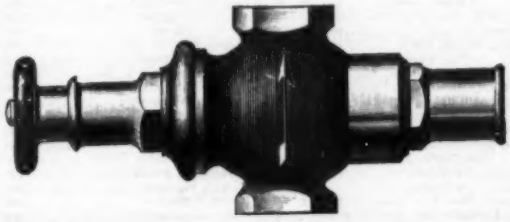
THE accompanying illustration is an exact representation of the improved rubber press manufactured by Edred W. Clark, Hartford, Conn. It was introduced some years ago, but has lately been much improved, and it has won staunch advocates of its merits in many rubber works where it is in use.



The machine is made of excellent material throughout, the screws being of the best refined steel with extra long composition nuts, and the steam plates are so cored that crushing them is impossible in the use of small moulds. The hand wheel is so placed on the screw as to treble the lever power of the old style press, and the pressure is limited only by the breaking strain of metal. They are made in six sizes ranging from 24x30 to 10x10. Mr. Clark also makes a specialty of rubber moulds, and elsewhere, in our advertising columns, he gives an excellent illustration of a tubing machine which is winning high encomiums from those who have seen it in continuous work.

The Heater Man's Relief.

IN the old-fashioned rubber factory, after a "heat" was "up," the greatest care was taken to keep the steam just at the proper notch, and not allow it to run either up or down until the vulcanization was finished. For this purpose a "heater man" was constantly opening and shutting the valves and even then failing to



keep up an even pressure. Through the courtesy of the Mason Regulator Co., of Boston, we append a cut of a simple contrivance, the "Mason Reducing Valve," which does away with all anxiety about evenness of pressure, and keeps the "heat" up to any point desired without possibility of variation. These valves are already in use in many of the larger rubber factories, and are found most valuable, not only on vulcanizers, but on presses, pumps, shoe heaters, etc. In the neat pamphlet entitled "Steam Regulating Specialties," which this company publish, we notice a warm testimonial to the efficacy of the Mason Regulator, from Engineer J. F. Mayall, of the American Rubber Company, Cambridge, Mass.

POISONOUS METALLIC CONTAMINATION OF INDIA RUBBER GOODS.—The india rubber tubing, stopples, infants' nursing bottle fittings, etc., of our market I have found to contain large quantities of zinc, which is a metallic poison. The use of zinc oxide, etc., in these goods is prohibited by law in Europe, just as is the use of lead oxide. That nursing-bottle tubing, nipples, teething-rings, etc., may stand in some relation to certain infantile diseases seems plausible. India rubber tubes are often used for siphoning wines, ciders and other beverages which might thus become polluted with zinc. It is noteworthy that in my examinations of india rubber goods I have never yet discovered lead; zinc oxide, *per se*, is not, perhaps, a poison. But, let it meet an acid, a poisonous zinc salt will result.—*Drug Circular.*

QUOTATIONS

FOR PIGMENTS, SOLVENTS, ETC., EMPLOYED IN THE INDIA RUBBER AND GUTTA PERCHA INDUSTRIES.

NOTE.—Every article herein named has been used in compounds for India Rubber and Gutta Percha. The accompanying quotations have been especially prepared and will be duly revised exclusively for THE INDIA RUBBER WORLD, and they represent current prices for average small orders. The publishers will be pleased to put buyers into communication with manufacturers of any of the articles quoted and no charge whatsoever, directly or indirectly, will be made for that service to either party.

Acetone, b. p. 57° c.	per lb.	$1 50
Acid, Abestic	per gm.	2 00
" Acetic	per lb.	0 28
" Benzoic, Germ	per lb.	0 65
" Boracic	per lb.	0 26
" Carbolic, Com	per lb.	0 60
" Cholalic	per lb.	0 42
" Chromic	per oz.	0 11
" Formic	per lb.	1 00
" Gallic	per lb.	1 30
" Hydrochloric	per lb.	0 23
" Nitric, 38°	per lb.	0 40
" Oleic, pure	per lb.	0 40
" Oxalic	per lb.	0 50
" Phosphoric	per lb.	0 50
" Silicic	per lb.	0 75
" Sulphuric	per lb.	0 15
" Tannic	per oz.	0 30
" Tungstic	per lb.	0 40
Actinium, Sulphide		
Alabaster Dust	per ton,	18 00
Albuminous Substances. *See* Casein, etc.		
Alcohol, Wood	per gal.	1 45
Alkalies, *See* Ammonia, etc.		
Alkanet, Root, powd	per lb.	0 22
" (Anchusin) paste	per lb.	6 50
Alum, lump	per lb.	0 02
" powdered	per lb.	0 06
Alumina, Sulphate	per lb.	1 00
Aluminium, Abietate		
" Acetate	per lb.	0 50
" Sulphate	per lb.	0 75
Alum. Earth, *Bauxite*	per ton,	8 00
" " Corundum	per lb.	
Ammonia. *See* Spirit.		
Ammonium, Bichromate	per lb.	1 20
" Carbonate	per lb.	0 09
" Chloride	per lb.	0 40
" Chlor. powd	per lb.	0 18
Aniline, Salt	per lb.	0 60
Anthracene	per oz.	0 12
Antimony, Sulph. black	per lb.	0 10
" " golden	per lb.	0 40
" (Kermes) Sulph. red	per lb.	1 25
Arrow Root, Jamaica	per lb.	0 20
Arsenic, Red Sulph. (Realgar)	per lb.	0 10
" Yel. " (Orpiment)	per lb.	0 15
Asbestine	per ton,	$20 @ 22 00
Asbestos, powdered, No. 3	per lb.	0 03
" short fibre, No. 3	per lb.	0 08
Asphaltum, *See* Gum.		
Assafœtida, *See* Gum.		
Azo-Benzol, Merck	per oz.	1 25
Balsam, Canada	per gal.	3 25
" Styrax	per lb.	0 30
" Sulphur	per lb.	0 40
Barium, Peroxide	per lb.	1 00
" Sulphate	per lb.	0 06
Benzol, Coal Tar	per lb.	1 00
Bismuth, *See* Glance.		
Bitumen, *See* Pitch, Mineral.		
Black Pigment, dry	per lb.	0 12
Bleaching Powd. *See* Lime Chlor.		
Blue Pigment	per lb.	0 30
" Ultramarine	per lb.	0 15
Bole, powdered	per lb.	0 12
Bone, Black, *See* Charcoal.		
" Dust, by bbl.	per lb.	0 02
Borax, lump, by bbl.	per lb.	0 08
" powdered	per lb.	0 09
Boron (Borium), crys	per gram.	4 00
Brimstone, *See* Sulphur Rolls.		
Bromine, Chloride	per oz.	0 75
Brown Pigment, dry	per lb.	0 04
Cadmium Sulphide	per oz.	0 50
Calcium Chloride	per lb.	0 40
" Sulphide	per lb.	0 40
Calomel	per lb.	0 80
Camphene, *See* Turpentine.		
Camphor, *See* Gum and Oil.		
Caoutchoucene.		
Carbon Bisulphate	per lb.	0 15
" Bisulphide	per lb.	0 11
" " highly rect'd	per lb.	0 20
" Trichloride, liq	per oz.	0 75
" " crys	per oz.	1 20
Casein (Caseum)	per lb.	0 80
Catechu, *See* Gum.		
Ceresin, *See* Wax Min.		
Chalk, Carbonate, Am	per lb.	0 05
" Precip., Engl	per lb.	0 08
" French, powd	per lb.	0 04
Charcoal, Anim. purif	per lb.	0 06
" Anim. powd.	per lb.	0 03
" Fine Willow	per lb.	0 12
Chlorine Water	per lb.	0 12
Chloroform, Purified	per lb.	0 50
Chrome, *See* Lead and Zinc Chromates.		
Chromium, Oxide	per oz.	$0 30
Cinnabar, *See* Mercury.		
Clay, China (Kaolin)	per lb.	0 05
" Pipe, powdered	per lb.	0 10
Cocoanut Fibre.		
Colcothar, *See* Iron.		
Collodion	per lb.	0 76
Colophony, *See* Resin.		
Copper, Oxide, Black	per lb.	0 90
" " Red	per lb.	1 25
" Sulphate	per lb.	0 05
Cork, granulated	per lb.	0 05
Cutch, Catechu, *See* Gum.		
Creosote, Creasote	per lb.	0 60
Dextrine, all shades	per lb.	0 09
Emery Cloth, all Nos.	per rm.	7 25
" Powder, by keg	per lb.	0 03
Ethyliden, Chloride	per oz.	1 00
Ether, Acetic	per lb.	0 65
Eupione, Mercks'	per gm.	0 35
Extract Cochineal	per lb.	1 25
" Indigo, best	per lb.	0 60
" " ord	per lb.	0 09
" Lake Liquor		
" Logwood	per pt.	0 60
" Mulberry, Fig	per lb.	0 50
Farina	per lb.	0 07
Feldspar, powdered	per lb.	0 10
Fibres, *See* Cocoanut, etc.		
Fibrin, Mercks', blood	per gm.	0 20
" " plants	per gm.	0 25
Flint Dust, by bbl.	per lb.	1 20
Formyle, *See* Acid Formic.		
Fuller's Earth, powd	per lb.	0 08
Galena, *See* Lead Sulphide.		
Gelatine, Cooper's sheet	per lb.	0 85
" French white	per lb.	0 80
Glance Bismuth	per oz.	0 60
" Copper	per lb.	1 00
" Silver	per oz.	3 00
Glass Liquid	per lb.	0 05
" Powdered	per lb.	0 08
Glue, Cooper's A, Ex	per lb.	0 24
" Isinglass, Am	per lb.	0 85
Gluten, Vegetable	per oz.	2 25
Glycerine	per lb.	0 25
Gold, Chloride and Sodium	per oz.	6 12
" Oxide	per oz.	24 50
Granite, Marble Dust	per bbl.	1 10
Graphite, purified	per lb.	0 75
Green Pigment, dry	per lb.	0 20
Gum Arabic	per lb.	0 90
" Asphaltum	per lb.	0 10
" Assafœtida	per lb.	0 15
" Benzoin	per lb.	0 60
" Camphor	per lb.	0 40
" Catechu	per lb.	0 25
" Copal	per lb.	0 30
" Damar	per lb.	0 25
" Elemi	per lb.	0 25
" Euphorbium	per lb.	0 20
" Gamboge	per lb.	0 65
" Juniper	per lb.	0 40
" Kowrie	per lb.	0 40
" Mastic, powd	per lb.	1 15
" Sandarach	per lb.	0 40
" Sanguis Draconis	per lb.	0 35
" Shellac, native	per lb.	0 23
" " bleached	per lb.	0 16
" *See* also Balsam, Resin.		
Gutta Percha Solution, *See* Traumaticin.		
Gypsum, *See* Alabaster, etc.		
Hemp Fibre	per lb.	0 14
Honey, Strained	per lb.	0 12
Horn Dust, Shavings	per lb.	0 06
Infusional Earth, domestic	per lb.	0 06
" " foreign	per lb.	0 08
Ink, India	per lb.	2 00
Iodine, Chloride	per oz.	0 70
" Resublimed	per lb.	4 00
Iron, Carburet, *See* Graphite.		
" Carbonate	per lb.	0 32
" Filings of	per lb.	0 10
" Oxide, black	per lb.	0 40
" " red (Colcothar)	per lb.	0 12
" Sesquichloride	per lb.	0 60
" Sulphide	per lb.	0 15
" Tungstate (Wolfram)	per lb.	0 30
Isinglass, *See* Glue.		
Ivory Black, *See* Charcoal.		
Jute Fibre	per lb.	0 05
Kermes, *See* Antimony.		
Lamp Black, B. & S	per lb.	0 06
" " Eddy	per lb.	0 20
" " Germ	per lb.	0 10
Lead, Abietate		
" Acetate (Sugar of Lead)	per lb.	$0 13
" Black, Am	per lb.	0 04
" Carbonate (Wh. L.)	per lb,	0 06
" " (Fl. White)	per lb.	0 15
" Chromate, powd.	per lb.	1 10
" Hyposulphite(Thiosulphate)	"	0 70
" Oxides, *See* Litharge, etc.		
" Peroxide (Puce)	per lb.	0 60
" Sulphate	per lb.	0 40
" Sulphide	per lb.	1 35
" Tannate	per oz.	0 30
Leather, Sole, powd	per ton.	11 00
Licorice, Calabria	per lb.	0 50
" American	per lb.	0 16
Lignine, *See* Fibrin, etc.		
Lime, Carbonate, *See* Chalk.		
" Caustic	per lb.	0 50
" Chlorinated	per lb.	0 63
" Phosphate	per lb.	0 25
" Spec. Prep	per lb.	0 03
Litharge, American	per lb,	0 06
" Foreign	per lb.	0 12
Magnesia, Carb., powd	per lo.	0 35
" Oxide	per lb.	0 30
" Silic., *See* Chalk. Fr.		
Manganese, Black Ox	per lb.	0 40
" and Iron, Chl	per lb.	0 30
Mass, *See* Iron Carbonate.		
Mercury, Bi-cyanide	per oz.	0 40
" Bi sulph. (Cinnabar)	per lb.	1 30
" Ferro cyanide	per oz.	1 50
" Red Oxide	per lb.	1 60
" Sub-chloride, *See* Calomel.		
" Sulph., *See* Vermilion.		
" " Black	per lb.	0 80
" Sulpho-cyanide	per oz.	0 30
" with Magnesia	per lb.	1 15
Methylene, Chloride	per oz.	0 60
Mica, ground, med	per lb.	0 10
Mineral Wool	per ton.	20 00
Minium	per lb.	0 06
Musk, Chinese	per oz.	0 45
Naphtha, Wood	per lb.	0 35
Naphthalene, Wht, Resublimed	per lb.	0 25
Naphthol, White	per lb.	1 50
Nickel, Sulphate, Ammoniated	per lb.	0 75
Nitro-benzol	per lb.	0 00
Oil, Camphor	per lb.	0 30
" Caraway	per lb.	1 10
" Castor, Am	per lb.	0 12
" Cocoanut	per lb.	0 10
" Colza	per gal.	0 62
" Cottonseed, Y. W	per gal.	0 60
" Dippel's (Bone)	per oz	0 30
" Eucal, Glob	per lb.	2 00
" Linseed, boiled	per gal.	0 55
" " raw	per gal.	0 50
" Musk	per oz.	0 75
" Neatsfoot	per gal.	0 75
" Palm	per lb.	0 06
" Paraffin	per gal.	0 90
" Peanut	per gal.	1 40
" Rapeseed	per gal.	0 64
" Resin, rect	per lb.	0 45
" Tar, Birch	per gal.	0 30
" Tar, Lignite	per lb.	1 00
" Thyme, White	per lb.	1 00
" Turpentine	per lb.	0 35
" Vitriol, *See* Ac. Sulph.		
" Walnut	per lb.	0 40
Orpiment, *See* Arsenic.		
Orris Root, powd	per lb.	0 16
Oyster Shells, ground	per lb.	0 15
Ozokerite	per lb.	0 25
Paper, Filter, Sand	per 1m.	4 25
" Nat., Emery	per rm.	6 25
" Pulp	per lb.	0 04
Paraffin, *See* Oil, Wax.		
Paranaphthaline, *See* Anthracene.		
Paris, White, by bbl	per lb.	0 01
Pearlash, *See* Pot. Carb.		
Petroleum, Am. Med	per gal.	0 09
" Ether	per pt.	0 40
Phosphorus	per oz.	0 50
Pigments, *See* Blue, etc.		
Pinol, L. & F	per lb.	6 00
Pitch, Black, by bbl	per lb.	0 04
" Auvergne		
" Burgundy	per lb.	0 06
" Egyptian	per lb.	0 09
" Mineral	per lb.	0 15
" Trinidad	per ton.	35 00
Plaster Paris	per bbl.	1 50
Plumbago, *See* Lead, Black.		
Potash	per lb.	0 06
Potassa, Caustic, com	per lb.	0 50
" " and Lime	per lb.	0 70
Potassium, Arseniate	per oz.	0 10
" Bichromate	per lb.	0 12
" Carbonate	per lb.	0 08
" Nitrate	per lb.	0 13
" Sulphide	per lb.	0 22
Pumice Stone, *See* Stone.		
Prussian Blue	per lb.	0 20
Pyroxylin, spec. prep	per oz.	0 35
Realgar, *See* Arsenic.		
Red Pigment, super	per lb.	0 09
Resin, *See* also Gum.		
" Dark (Colophony)	per lb.	0 06
" White	per lb.	0 04
" Yellow	per lb.	0 03
Rhigolene, *See* Pet. Ether.		
Salt, *See* Sod. Chloride.		
Sand, Fine, White	per bbl.	1 50
Sawdust, v. fine	per bbl.	0 25
Sea Weed, Tang	per lb.	0 90
Selenite, powd	per oz.	0 15
Selenium	per oz.	3 00
Sienna, burnt and powd	per lb.	0 02
Silica, *See* Ac. Silicic.		
Silver, Metallica	per lb.	1 30
Slate, pulverized	per bbl.	0 70
Soap, Castile, White	per lb.	0 12
" Olive, Soda	per lb.	
Soap Stone (Steatite)	per lb.	0 05
Soda Ash (Bicarb.)	per lb.	0 02
" Caustic	per lb.	0 03
Sodium, Bi-borate	per lb.	0 80
" Bi-chromate	per lb.	0 25
" Chloride	per lb.	0 30
" Hydrosulphide	per lb.	0 70
" Metallic	per oz.	0 35
" Nitrate	per lb.	0 14
" Silicate, *See* Glass Liq.		
" Sulphate	per lb.	0 20
" Tungstate	per oz.	0 09
Spar, *See* Barium Sulph.		
Spirits, Ammonia	per lb.	0 47
" Camphor	per lb.	0 50
" Turpentine	per gal.	0 45
Sponge Cuttings	per lb.	0 15
Starch, Corn, pulv	per lb.	0 06
" Pure, by bbl	per lb.	0 05
Stearine	per lb.	0 17
Steel Filings	per lb.	0 12
Stone, Pumice	per lb.	0 03
" Rotten	per lb.	0 07
Sulphur, Chloride	per lb.	0 80
" Flowers, wash	per lb.	0 07
" Liver, *See* Pot. Sulph.		
" Precip., pure	per lb.	0 11
" Rolls, by bbl	per lb.	0 02
Talc, *See* Chalk, French.		
Tallow	per lb.	0 04
Tannin, *See* Acid Tannic.		
Tapioca, Pearl	per lb.	0 07
Tar, Common	per bbl.	3 00
" Stockholm	per lb.	0 12
Terra Alba	per lb.	0 08
Tin, Bi-chloride	per oz.	0 15
" Bi-sulphide	per oz.	0 25
" Muriate	per lb.	0 40
Toluene, Toluol	per lb.	0 60
Tonka Bean	per lb.	1 60
Tortoise Shell, powd	per lb.	0 05
Traumaticin, Mercks'	per oz.	0 20
Tripoli, Mt. Eagle	per oz.	0 65
Tungsten, Oxide, pure	per oz.	0 40
Turpentine, Chian	per oz.	0 50
" Camphene	per gal.	0 55
" Venice	per lb.	0 19
Umber, burnt and powd	per lb,	0 02
Varnish Settlings	per gal.	0 23
Vegetable Black, spec. prep	per lb.	0 10
Vermilion, American	per lb.	0 18
" English	per lb.	0 60
Vitriol, *See* Copper Sulphate.		
Wax, Carnauba	per lb.	0 16
" Japan	per lb.	0 15
" Mineral	per lb.	0 16
" Paraffin	per lb.	0 05
" White	per lb.	0 45
Whalebone, ground	per lb.	0 25
Whiting, by bbl	per lb.	0 01
Wolfram, *See* Iron.		
Wood Pulp, ground	per lb.	0 02
Yellow Chrome, *See* Lead Chromate.		
" Pigment, dry	per lb.	0 06
Zinc, Abietate		
" Chromate	per oz.	0 25
" Oxide, G. Seal	per lb.	0 08
" " R. Seal	per lb.	0 07
" Sulphate	per lb.	0 07
" Sulphide	per lb.	0 18

Recipes.

CEMENT—very adhesive and transparent. Mix, in well-stoppered bottle, 10 drachms of chloroform with 12½ drachms of unvulcanized *india rubber* cut into small pieces. The solution is readily effected, and, when it is completed, add 2½ drachms of mastic. Let the whole macerate from eight to ten days, occasionally shaking the bottle, and the product is a very attractive cement, possessing an extraordinary degree of tenacity.

GLUE, for batteries, etc. Dissolve 1 part *india rubber* in 12 parts of benzol, and, to the solution, add 20 parts powdered shellac, heating the mixture very cautiously over a fire.

BLACKING, waterproof. Place into one pint of camphene (purified oil of turpentine) all the *caoutchouc* it will dissolve, then add one pint of curriers' oil, and gradually incorporate, through the agency of heat, seven pounds of tallow, besides two ounces of lampblack.

Good! Tell Another Story, Mr. Pratt.

MR. PRATT, of the Johns-Pratt Co., of Hartford, anent the announcement that he is about to make a shoe of asbestos, tells the following story: Some years ago an engineer went from the States to a certain part of Canada, where the people retained all of their pristine innocence. It so happened that this man was somewhat of an original, and among other ideas of his own were a pair of stockings made of asbestos. These he wore constantly, and when evening came, instead of washing them and hanging them on the line to dry, as was the custom there, he simply put them in the stove and burned them clean. One evening as he was doing this in the quiet of his cabin, a curious "Canuck" peeped in the window, and seeing the stockings put on the glowing coals and apparently burned up and still remain unconsumed; nay, further, taken out, cooled and put on the owner's feet, thought he had discovered an invention of the devil. He therefore straightway spoke to the parish priest, and told him of the whole strange proceeding. That worthy man, sympathizing with his parishioner, at once pronounced the engineer a votary of the black art, and one who should at once be driven from their midst. This pronunciamento was of course sufficient, and the bewildered man was hustled out of town, while the tale of his unhallowed practices passed into the quaint legends of the place, to be told to curious travelers, and to grow with each telling until it possessed all the gruesomeness of the genuine ghost story.

New Use for Rubber Nipples.

A CORRESPONDENT of *The Druggists' Circular and Chemical Gazette* writes from Merrimac, Mass.: "Having a prescription for vaginal suppositories, and nothing but an old set of tin moulds from which it was next to impossible to remove the suppositories after they were cold, I looked about the store for a better arrangement, and found it in black rubber nipples—those that go on over the top of the bottle. The hole in the end was closed by a small piece of court plaster; the nipples were then supported in a piece of tin with holes punched to receive them, and placed in a dish of ice-water to cool. The suppositories, after hardening, were removed by turning the nipples down away from them. When the nipple is full, the mass weighs about eighty grains; the size can be regulated in filling. This may be an old trick, but I have never seen it before, and if it is, it is the cheapest and best I have ever seen."

—For the benefit of those who abhor printers' ink as a prime factor to the advancement of their interest, we would state that Sampson—the strong party—was the first man to advertise. He took two solid columns to demonstrate his strength, and several thousand people "tumbled" to the scheme. He brought down the house.—*Democratic Union.*

An Important New Mineral.

THE following letter recently addressed to the *Oil, Paint and Drug Reporter* from Frisco, Utah, explains itself:

I published in the *Reporter* in 1883 a report on the petroleum and mineral wax deposits of Utah and Wyoming Territories. At that time there was great excitement about Ozokerite. Every miner had a claim for sale. Asphaltum, dried petroleum, asphaltic shale and mineral wax, were to the ignorant miner all the same, and as it was reported to be worth from five cents to a dollar a pound, every one who had a claim imagined himself a millionaire. As there was not a refinery for mineral wax in the United States, and as the miners had not the energy to send it to London, the whole thing fell flat, and I doubt if ten tons of the mineral was shipped out of the territory. On the top of the Wasatch Range, at Solders Pass, I found a few veins of genuine ozokerite, the largest being from eight to ten inches wide. In 1883 there was no railroad on which to ship it, but now the Denver & Rio Grande passes near the deposits and one company is shipping a few car loads. Several years ago Mr. Gilson discovered a deposit of pure asphaltum near the southern border of the Indian reservation. He and his friends had influence enough to get an act of congress passed, permitting them to develop it. Gilson imagined the asphaltum had peculiar qualities and he named it Gilsonite. A considerable quantity has been shipped to St. Louis, where it is used to make varnish. Last winter a party of cattle men discovered another deposit that had the appearance of Gilsonite, but on examination it was found to be insoluble in cold alcohol, benzine, chloroform, bi-sulphide of carbon, and it was not brittle, but when shaved into thin strips was elastic. The shavings have every appearance of horn shavings of a brown color. Some Salt Lake City experts pronounced it elaterite, and forthwith the miners, cattle men and inhabitants of Price Valley noised it about that a genuine *india rubber* mine was discovered and it was worth seventy cents a pound. When burned it gives off a peculiar odor, more like burned leather than anything else I can compare it with.

I visited the valley yesterday and found quite an excitement over the prospective fabulous wealth to flow from india rubber. On inquiring for mineral wax I was shown asphalt, Gilsonite, elaterite and bituminous coal, all going under the name of wax. As but few persons are familiar with elaterite, I copy a description from Dana:

"Elaterite.
"Mineral Caoutchouc.
"Elastic Bitumen.

"In soft flexible masses, somewhat resembling caoutchouc or india rubber; color brownish black, sometimes orange red by transmitted light. G—0.9—1.25. Composition: Carbon 85.5, hydrogen, 13.3=98.8. It burns readily with a yellow flame and bituminous odor."

The mineral found here does not answer this description, for it is not elastic, unless cut into very thin strips, when it resembles the shavings from horn or whalebone. I send by this mail a sample for your inspection and to be tested. I believe it is an unknown mineral and that it will prove to be an excellent article to insulate wires for telegraphic purposes, and the very thing to make a success of underground wires. The quantity must be large, for new deposits are discovered every week. I have been told of real elastic deposits, but as I could not see a specimen I rather decide the parties have elastic imaginations. However, that a valuable mineral has been discovered is beyond doubt. Its insolubility in liquids that readily dissolve asphaltum proves it valuable for many purposes, as its elasticity in thin layers will certainly cause it to be used for many purposes. I am promised a sample of the *real simon pure gum elastic*, and when it arrives will forward you a sufficient quantity to be tested. I have no claims nor interests to serve, and write to draw attention to what may prove a new article of merchandise, *from one of the most interesting deposits of hydro-carbons in the world.*

WM. L. LAY.

—During the past year the exportation of India rubber from Brazil amounted to more than 15,000,000 kilograms, of which 10,110,-000 kilograms were shipped to this country.

Review of the Rubber Market.

DURING the last six weeks, the rubber market has experienced a strong upward movement. This movement set in towards the end of August, following a somewhat lengthy period of depression, during which the price of fine Para had declined as far as 60 cents, and that of coarse to 37 cents. When this point had been reached, manufacturers who had been holding off the market and allowed their stocks to run down very low, began to show renewed interest in the article, and a strong demand sprung up, which, coming at a time when supplies are very small, was the immediate cause of a reaction. The rubber arriving at Para was eagerly taken up at advancing prices, and, as the volume of receipts there was by no means sufficient to meet the existing trade requirements, the spot stocks here had to be freely drawn upon, while considerable quantities were also brought over from Europe to this side. The sales in this market during September were very large, the total deliveries for the month amounting to no less than 1,600,000 pounds of fine and coarse Para. These transactions have been accompanied by a steady rise in prices, and the market closes firm at 69 cents for new fine, while up to 73 cents has been paid for old. Coarse Para has advanced even more, in proportion, there being an unusual scarcity of this grade, and the present quotations are 46 to 49 cents, according to age. The statistical position of Para rubber is strong; stocks here are smaller than they have been at any time during the past four years, amounting to only about 650,000 pounds, and the European stocks have been much reduced by the good consumption over there, as well as by the transshipments to this side; altogether the world's stocks are below the average at present, and less than they were at the same time last year. The receipts at Para for the first three months of this crop—from July 1st—have not shown any increase whatever over those of the previous year, as has usually been the case, and there are not wanting reports that this season's crop will fall short of last year's—a statement which, however, can only be verified by the events later on. The improvement in Para rubber, and more particularly the scarcity of coarse Para and of Central America rubber, have not failed to produce a favorable effect also on African and other kinds, all of which have more or less shared in the advance. The available stock of good Central American rubber, especially of Nicaragua, is very small: the last price paid for Nicaragua scrap was 45 cents, but there is no more obtainable thereat. Stocks in England of African kinds are about 600 tons less now than on the 1st of October 1888, and here, too, they are much smaller than at that period.

—For the past year the exports of rubber from Guatemala foot up 35,303 lbs., an increase of 5,000 lbs. over last year. This useful article has been hitherto badly handled by a bleeding process of the trees which threatens to measurably exhaust them. The attention of the authorities, however, has been called to this maltreatment, and they are taking active steps to prevent its continuance. The rubber tree grows well on good soil, and might be planted with reasonable expectation of a favorable pecuniary return, but as from fifteen to twenty years are required to obtain a profitable result, it does not hold out such inducements for enterprise as the agriculturist demands, unless in connection with banana plantations. When the tree bearing that fruit is exhausted it may come into its place.